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THE LAND WE LIVE IN



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The moose call

THE LAND WE LIVE IN

THE BOYS' BOOK OF CONSERVATION

BY

OVERTON W. PRICE

VICE-PRESIDENT NATIONAL CONSERVATION ASSOCIATION

WITH A FOREWORD

BY

GIFFORD PINCHOT

PRESIDENT NATIONAL CONSERVATION ASSOCIATION

ILLUSTRATED FROM PHOTOGRAPHS



BOSTON

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FOREWORD

NO people are prouder of their country than we Americans, but very few of us have any real knowledge about the three million square miles which we call the United States. Yet there are very few stories so interesting and so well worth hearing as the story of what there is in the land we live in.

When Mr. Price was kind enough to let me read the manuscript of his book, I did so with the keenest interest, at first because he is an old friend, but afterward because the book itself held my attention with uncommon power. Indeed, I have never seen so good a statement of the great Conservation problem as this.

It tells but half the story to say that this is an admirable book for boys and girls. If I may judge from my own experience, it is about as good for grown-ups also. Most of our boys and girls already understand that this is their country just as much as it is the country of their fathers and mothers. But that is not the whole truth. For this country of ours belongs far more truly to the boys and girls than it does to us older people. They will live in it and enjoy it longer than we shall; and everything that happens in it, every bit of waste, and every saving of waste, will affect their lives more than it does ours. We are only the trustees, taking care of the country for them until they are ready to take care of it themselves. And when that time comes, they will then become in their turn what we are now — trustees for those who are coming afterward.

It is peculiarly appropriate that Mr. Price should have written this book. His experience has been exactly what he needed to fit him for the task.

Mr. Price is a forester, and was for many years my right hand in the Forest Service. Indeed, if credit could be allotted justly for work done, I believe it would be found that he had more to do with the success of the Service than I had. In addition to his intimate knowledge of the whole country acquired in the Forest Service, Mr. Price has been associated with the Conservation movement from its very beginning. It was with him that I discussed it first after the idea had occurred to me, and from that time to this little has happened in Conservation which has not profited by his wide knowledge, remarkable powers of organization, and unusual executive ability. As a member of the National Conservation Commission, Secretary of its Section of Forests, and once more the right hand of its Chairman, and as Vice-President of the National Conservation Association, he has had and has used to the full an unrivaled opportunity to apply the foresight and training he acquired in Forestry to all phases of Conservation. His scientific accuracy is the guarantee for the accuracy of this book.

Personally, Mr. Price is so warm a friend of mine that what he says about me in his book must be taken with many grains of salt. He is strongly prejudiced in my favor.

I hope this admirable book may have what it deserves; the widest circulation among the young people of America. All the boys and girls who read it while they are young will be more useful to the Nation because of it when they grow up; and unless I am mistaken, they will thoroughly enjoy reading it besides.

GIFFORD PINCHOT

GREY TOWERS, Milford, Penn.

June 8, 1911.

PREFACE

BY rights this book should be signed by two men instead of one. Were it not for the generous protest of my friend, Mr. Thomas R. Shipp, his name would appear with mine on the title page. It was with Mr. Shipp I first discussed the idea of a boys' book on Conservation; it was Mr. Shipp who worked over its outlines with me; it was he who gave point and direction to the idea, and who steered the progress of the book away from dull essay and into the field of description of the land we live in; and it was he who gave to a crude manuscript most of what finish it possesses, through the exercise of a remarkable editorial capacity, and a no less remarkable clearness of vision in distinguishing between essentials and non-essentials. Mr. Shipp has had a most unusual training in Conservation. As secretary of the great Conference of Governors held at the White House, of the National Conservation Commission, the National Conservation Association, and the National Conservation Congress, he has been in a position where nothing in the Conservation movement could escape his own knowledge and attention. It is a source of very real regret to me that through Mr. Shipp's generosity I am unable to place his name on the title page with my own where it really belongs. It would have been a keen gratification to me to have our names linked in the production of this book, which is simply another step in work in which we have been closely associated for many years.

Many old friends in the Forest Service have given me

their help most generously in the preparation of this book. Among them are Raphael Zon, who practically wrote the last chapter and much improved the others; Herbert A. Smith, who read the manuscript to his own boys and strengthened it greatly through his and their suggestions; Eugene S. Bruce, Wesley Clifford, William T. Cox, and Fred G. Plummer, all of whom have guided its footsteps where they faltered and helped it over many an obstacle in the road. That the book has reached its journey's end is due in large part to each of these men of the Forest Service.

To John L. Lathrop I owe an ever ready help and encouragement, by which this book has greatly benefited. The Honorable Charles D. Walcott, Secretary of the Smithsonian Institution, Dr. A. K. Fisher of the Biological Survey, John L. Cochrane of the Bureau of Mines, and members of other branches of the public service have aided greatly by constructive criticism and in pictures for use in illustration. The Hon. George Shiras, 3rd, has kindly permitted the use in the chapter on "Wild Life" of several of his wonderful pictures of big game. Mr. Julian A. Dimock, Mr. R. A. Throssel, Mr. Frank F. Liebig, and Mr. Erwin E. Smith have by their generous coöperation in allowing the use of their pictures, given the book both beauty and value in illustration.

Had it not been for the zealous and productive help given by Mr. H. A. Slattery, this book would still be merely something planned, instead of in your hands. In several stages of the work, I have profited greatly by the assistance of Mr. Frank G. Heaton.

We already begin to feel in higher prices for poorer products, the pinch which is the penalty for waste of soil and forest and underground. But those who immediately follow us will pay still more dearly for the past misuse of

natural resources, which belongs to them in common with ourselves.

The thought that a boys' book on Conservation had possibilities for usefulness came through the conviction that American boys are even more deeply concerned in what is being done with our great natural resources than those Americans who are boys no longer.

OVERTON W. PRICE

WASHINGTON, June 1, 1911

TABLE OF CONTENTS

	PAGE
FOREWORD	vii
PREFACE	ix
CHAPTER ONE.—AMERICA THREE HUNDRED YEARS AGO	
This Country Then	3
What We Owe the Settlers	7
The Indians Then and the Indians Now	9
A Picture to Remember	14
The Journey	16
Home Again	18
CHAPTER TWO.—AMERICA TO-DAY	
Another Journey	19
The Open Country	23
We Must Live Within Our Means	32
Not only the Settlers were Blind	33
CHAPTER THREE.—HOW THE FOREST IS USED, ABROAD AND AT HOME	
In Germany	35
Elsewhere in Europe	40
In the Southern Pine Belt	43
Among the Douglas Fir	47
Logging in the North Woods	54
The Same Nearly Everywhere.	60
We Must Grow Timber or go Without	63

CHAPTER FOUR.—IN A NATIONAL FOREST

	PAGE
A Busy Job	67
The Cowboy	72
The Timber Sale	77
How the Fires Start	80
Fighting the Fire	87
Brave Ranger Pulaski	90
Fire Not the Only Enemy	93
The Forester	94
Private Forests	94
Teaching the People	96
Two Great Tasks	98

CHAPTER FIVE.—THE FARMERS' FARMS AND THE
NATION'S FARM

Cotton and Corn	100
Boys the Best Farmers	105
North and West.	107
We Must Grow what Food We Need	113
The Public Domain	115
The Shepherders and the Cowboys	122
Stock Followed Buffalo.	127
The Range is Being Wasted	129
The Work of the Reclamation Service	132
Three Great Problems	138

CHAPTER SIX.—THE TREASURES UNDERGROUND

In a Coal Mine	143
Waste of Life and of Coal	148
The Bureau of Mines	152

TABLE OF CONTENTS

xv

CHAPTER SEVEN. — WILD LIFE

	PAGE
The Roe Deer and the Ranger	159
A Royal Hunt	162
The Young Germans in New York	163
How the Game has Dwindled	167
Predatory Animals Cost us Dearly	177
We Can All Help to Save the Game	182

CHAPTER EIGHT. — THE RIVERS

One More Journey	184
The First Sign of Use	188
Who will Control the Water Powers?	193
Other Great Uses	197
Rivers are Roads	201

CHAPTER NINE. — WHAT THIS MEANS TO US

The Merchant's Son	206
The Farmer's Son	208
Why Taxes are Higher	209
The Nation and the Government	211

CHAPTER TEN. — HOW WE CAN HELP

Knowing the Game	213
Learning the Game	214
Organization Counts	216
The Railroad	217
The Police Squad	217
We Can All Help	219

CHAPTER ELEVEN.—THIS IS CONSERVATION

	PAGE
The Ship of State	221
A Good Fight	224

CHAPTER TWELVE.—AN INVENTORY OF NATURAL
RESOURCES

Forests	228
Lands	232
Waters	234
Minerals	235
INDEX	239

LIST OF ILLUSTRATIONS

The moose call	<i>Frontispiece</i>
	PAGE
The lighthouse which the settlers built at Cape Henry, Virginia	2
The early pioneers are gone, but the "Musher" in far-off Alaska is the pioneer of to-day	4
In a salmon cannery. Fish now yields us fifty million dollars' worth of food a year.	7
The happiest Indians are working their own little farms . .	10
The Indians have had a very sad story	11
An Indian burial scaffold.	12
The Roosevelt dam was built chiefly by Indian laborers . .	14
The arrow maker. The arrows with which the Indians used to kill their game are now made and sold as curios. . . .	15
Through the busy New York streets. Fifth Avenue . . .	20
A floating hotel, nearly two hundred yards long	22
Each with its little orchard	24
Charred skeletons along the track	25
In a jumble on the ground	26
Over there is a bare hillside	29
The revenge taken by the river	30
A big block of old forest	36
The valleys make a carpet of many colors	37
Some of the roofs are thatched with straw	38
Now the trail leads us by a forest nursery	39
The ruined castles on its banks	41
An old turpentine "orchard"	44
The log loader at work	45
In the beautiful Cascade Mountains	48
Pulling logs down the chute	50
There are two men felling a Douglas fir	52
We begin to meet sleds piled high with logs	55
The camp is the loggers' home	56

	PAGE
Dinner in a North Woods logging camp	57
We might go into the Lake States	58
Getting cypress logs out under difficulties	59
Japan is growing trees to plant	62
Norway is overcutting her forests, like ourselves	61
India buys more wood than she sells.	63
We go in over a carefully laid-out trail.	66
"I believe there are a few back East," says the rancher.	
In the Appalachian National Forest, which the Govern-	
ment is buying as a great reservoir of timber and water.	68
They are fastening wire to the trunks of trees	70
"Trails and telephone lines are the best safeguards against	
fire"	71
"The Forest Supervisor puts the cattle on the lower slopes	
where they belong"	73
"He puts the sheep on the high ranges where they do best"	74
"Straight to the packing house in Chicago or Kansas City"	75
"You will pass a hunter's cabin"	76
We leave the cowboy reluctantly	77
The brush is burned when the ground is moist	78
Or after the first snowfall	79
He looks long at something we do not see	82
Then he unfolds his map, and follows its lines intently	84
"Fire just this side of Saddle Mountain"	85
Half an hour brings us to the ranger's cabin	86
A forest blasted where it stands	88
Cotton like snow over the ground	101
Spindling, yellow-green corn stalks	102
The farmer counts more than the land	103
Without good roads crops cannot be hauled to market	105
Good roads no less than good crops are needed to make	
prosperity	106
Even the boys and girls suffer from bad roads	107
Where children walk dry-shod and easily to school	108
Ranches where the use of fertilizers is as yet unknown	109
How some pioneer farmers in the Southwest bring in the hay	110
Where farming is a struggle for existence	111
The handiwork of the man who is a good citizen and a good	
farmer	112

LIST OF ILLUSTRATIONS

xix

PAGE

Remember Germany, with its beautiful villages	114
The soil was meant for many men to live on and improve	115
Like green garlands on a dull carpet	117
A loneliness which cannot be told in words	118
More and more cattle	119
The cattle graze in open order	120
A shepherd's burros. One is eating a newspaper!	121
Their lithe figures a straight line from heel to head	122
There is much that is stirring about the life of mounted men.	
A cowboy of Argentina	123
A bucking mustang	124
In the sun-baked corral	125
Roping and throwing a calf for branding	126
Branding a calf	127
Roping picked cattle from a herd	128
Heavy with fruit	131
We see the sluices from which the land is flooded	132
We come to a great reservoir	133
We would find many such great dams, some completed,	
others now being built	135
They have tunnelled through a great mountain	137
Mining copper, a mile underground	140
At the mouth of a copper mine	142
A boy driver and his mule in a coal mine	146
In one of the "rooms" of a coal mine	147
After the explosion. At the mouth of a coal mine, after a	
disaster which killed 356 men	150
Waiting. The crowd near the mouth of the shaft after a	
disaster in a coal mine	151
Mining gold in Alaska	154
How the trained men of the Bureau of Mines are equipped to	
save life in mine disasters	153
The midnight reflections of a white-tail deer	157
A long swim. A caribou crossing a lake in Newfoundland	158
The end. Mortally wounded during a snow storm, this	
deer was not found by the hunter	160
A happy family	161
Not sure what's going to happen	165
Find three wild turkeys!	166

	PAGE
A baby moose	167
The antelope are now so nearly gone that some States forbid their being killed at all	168
In the velvet. Mr. Walcott photographed these elk in the early morning, when they were investigating his camp	169
What kindness will do	171
Catching the Bronx Zoo crocodile	170
More kindness. The man feeding the bear cubs is a Forest Supervisor in charge of one of the National Forests	172
The man holding the Manatee, or sea-cow, is Mr. A. W. Dimock, to whom all Americans owe a great debt for his wise and vigorous efforts for the preservation of the wild creatures	173
Forty years ago there were five million	174
A moose at bay	174
A wild goat at home.	175
A bear swimming a stream	176
Mr. Eugene S. Bruce and his bear. Mr. Bruce caught this cub with his hands, in the California mountains. It is now in the Washington Zoo	177
Not much of him individually	179
An old buffalo bull	180
True sport. The tarpon has better than an even chance	181
A fine mountain sheep	182
The elk greatly need better protection	183
Our river first drinks from melting snows	185
Resting in deep pools	187
It is a great pipe line	189
The power-house	190
Others depend on dams for the storage of water.	191
The existence of Los Angeles depends on water power	192
Power is hidden in every waterfall	193
Sometimes water used to develop power never returns to the streams again	196
The walrus are being killed off	197
A female seal and her pup	198
Seal on the rookeries. The groups are called "harems," the small seal are the females, and the big seal are males, and known as the "harem masters"	200

LIST OF ILLUSTRATIONS

xxi

PAGE

Where thousands ran before. Can you find the leaping salmon?	199
Tonging for oysters	201
An oyster stunted by mussels which eat its food	202
A planted oyster shell	203
Learning the game. A school garden is a good place to begin	215
Ramming their way down the field	216
On the New York Ghetto. These boys are being taught in school about the waste of natural resources, and how it may be prevented. Are you?	218
With every white sail set.	223
Some nations are poor like some children. Countries which have wasted their resources are dependent, and must buy elsewhere. If they lack money, then they must go without	225
Its green forests clothing the mountains	226
Struggling to win back the land. The dark strips are young trees, which are slowly covering an old burn	230
Forestry in a National Forest. Forestry is practised on less than one per cent of the forests privately owned	231
Many million acres of desert can be made productive by irrigation	234
In China, where now the mountain forests are gone, the soil can be held only by terracing	236

The Land We Live In

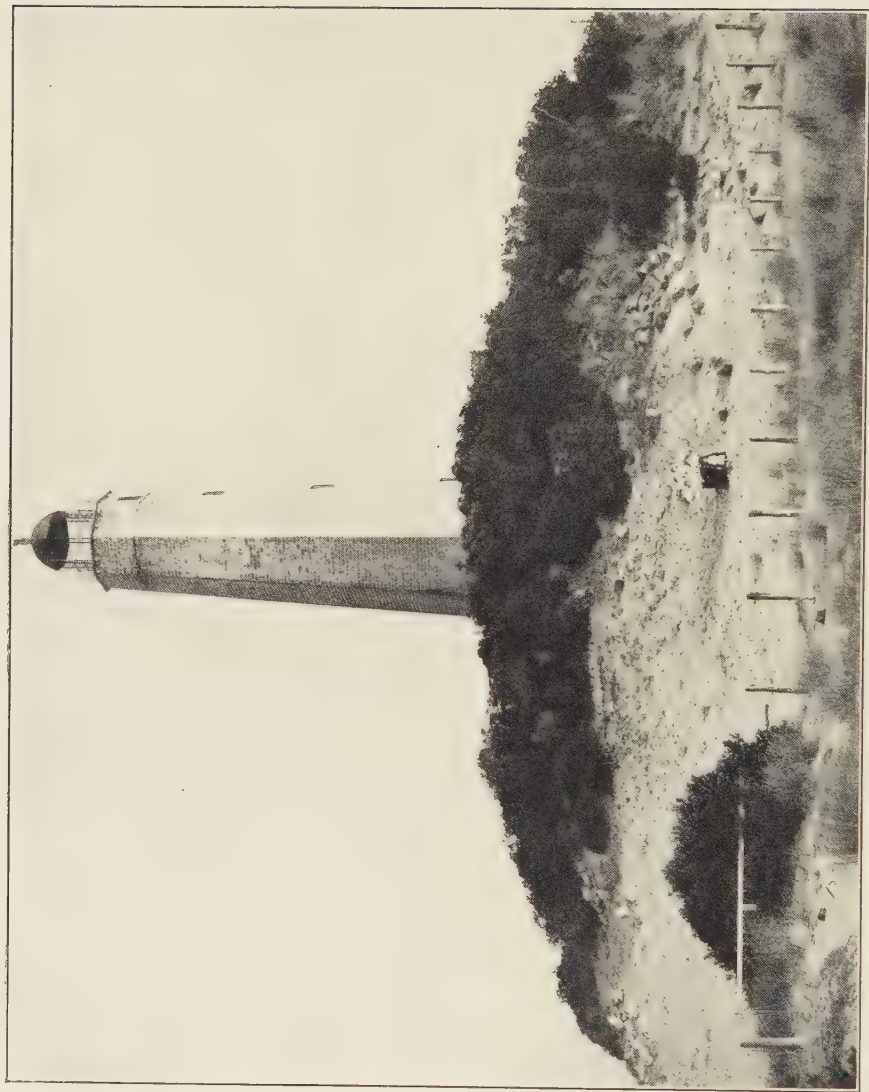
CHAPTER I

AMERICA THREE HUNDRED YEARS AGO

FIRST we must know what kind of country was this America of ours when the settlers landed from their battered wooden ships, no bigger than our ferry boats, on the shores of what are now Massachusetts and Virginia, and began the struggle to build their homes. At Cape Henry on the Virginia coast, they built a lighthouse, and made it so strong that it is standing to-day, after facing storm and sunshine for more than two hundred years.

From your window you can look out and see houses where your friends and schoolmates live, and big buildings and pavements, and perhaps street cars and automobiles. Did you ever stop to think what hardships the settlers suffered so as to make these things possible for us — how they had to clear the land, build log cabins, make trails and roads, and bridge the rivers? The splendid story of their lives in the wilderness is more interesting than any novel one can read, and it is a story we all ought to know, because if it had not been for the fight they made, we might not be citizens of the United States.

They are all gone now — those brave-hearted men and women who left their own country for this one because they wanted to be free. We can see only in paintings how they looked, and what kind of hats and clothes they wore. Maybe if we should ask our grandparents, they would tell



The lighthouse which the settlers built at Cape Henry, Virginia

us stories which their own grandparents told them, of some of our forefathers, who built log cabins, and killed deer and bear, and fought Indians, and lived the vigorous life of the pioneer.

We must not forget that there were boys and girls then as now, only they played different kinds of games from those we play nowadays. At first there were no schools for them to go to. Their parents taught them at home, and they did not have many books. They read at night by the light of pine splinters, or of queer little candles.

Those boys and girls stayed pretty close at home, for it was not safe to stray too far from the little cabins, because of the wild animals and the Indians. Even when the settlers went to church on Sunday the men often carried guns with them for fear of the red men. They were strange, heavy guns, with cup-shaped muzzles, not at all like the trim rifles we have to-day.

We are going to take a trip with the settlers. But first we need to know what kind of country we shall find, when we leave the little clearing around the cabins.

This Country Then.

First of all, there were the forests which not only covered the mountains, but stretched all the way from Maine to Florida and from the east coast to the great western prairies which begin about one-third of the way between the Atlantic Ocean and the Pacific. At first the settlers thought America was all forest, and it was not for many years that their journeys into the plains and deserts of the far West taught them that this was not true.

This great American forest spread over nearly half the United States. It was alive with game, for what the Indians killed made little difference even when the ani-



Photo by Dobbs

The early pioneers are gone, but the "Musher" in far-off Alaska is the pioneer of to-day

mals were easy to slaughter. This the Indians did with the buffalo, by driving great herds over high cliffs, or by killing them one by one. The deer and bear, and the moose and elk, as well as the smaller creatures, were all plentiful. You know the wild animals in any region are limited to as many as it can best support. Animals of any one kind are not killed out by other kinds, because they have certain advantages which the others do not possess. Nature has given keen sight and strong, sharp claws to the eagles, great cunning and speed to the foxes, a wonderful gift of scent to the deer, and sharp hoofs and powerful, shovel-shaped horns to the moose, as weapons against their natural enemies, such as the sharp-toothed wolf, and the slinking, crouching, cat-like puma.

In those days there were not only many more wild animals than there are now, but they were much more savage. The bear, the great gray timber wolf, and the other big, fierce creatures had not fully learned to fear man. Even as late as fifty years ago there are true stories of grizzly bears which actually drove miners and frontiersmen out of camps in the mountains. To-day one hardly ever hears of bears attacking men, except when wounded or penned in by dogs, or when a she-bear fights to protect her cubs. For the settlers it was a different story — their fear of wild beasts came only second to their fear of wild Indians.

In those days a journey through the great green forests and down the beautiful clear rivers which the forests make must have richly repaid the settlers for all they endured. The dense forests through which they struggled were valuable not only for the timber in the pines, the oaks, the great tulip trees, and all the other beautiful hardwoods, but they stood upon land which would make splendid farms after the forests were gone. But in those days there were no farms, except the little clearings the Indians made to grow

their corn, and the settlers' scanty fields, from which they had driven back the forest with the axe and fire.

There were the minerals — gold, copper, silver, and above all, coal, which is now more necessary to man's existence and to his happiness than the other three together. Some few of the settlers knew a little about precious minerals, and they were delighted with what they found, but the value of the coal they did not realize at all. Stories went back to England of the great treasures underground in the New World; but even the wildest of these stories fell far short of describing the mineral wealth of America.

The rivers, the settlers knew, were splendid streams of clear water, many of them big enough to carry ships. Of course, the settlers looked upon the streams simply as roads to travel over, as sources of water to drink, and as natural drains for the country. The most far-sighted among them did not dream of the great power locked up in the rivers. Even to-day we are just beginning to understand how the streams can be harnessed, and the force of fast-flowing water used to turn wheels to make electricity, which can be used in a thousand ways to do man's work for him.

In the days of the settlers, all that was known about water power was that water could be made to turn a mill wheel, either when it fell on top of the wheel, or rushed against it at the bottom. We have all seen such mills, but we are likely to see much fewer of them as we grow older, because they are the most wasteful way of using water power.

Then there were the fish — the food fishes of the salt water, and the salmon and trout and bass, and the many other useful fresh-water fish. Many of us have not stopped to think that fish from American waters now yield about fifty million dollars' worth of food every year. Of course, there were many more fish than there are now, because we

not only have been using them ever since, but using them so wastefully that some kinds have almost completely disappeared.

The climate was the most important resource of all; the rain that gives life to all green things, and the sunshine which keeps them alive and growing. Some of you know



In a salmon cannery. Fish now yield us fifty million dollars' worth of food a year.

what the lack of rain means — in the great West where there are thousands of square miles of rich soil, on much of which nothing is growing except cactus or sagebrush, simply because it rains very little or never rains at all.

What We Owe the Settlers.

Perhaps when one goes into our own Western country on his first trip — not the Western country seen from the car windows, but the real West, way back in the mountains

where the trains don't run — he feels just a little as the settlers felt when they first saw America. But after all, wild as the West still is here and there, one does not lose the feeling that within twenty-five, or fifty, or even a hundred miles, are towns and stores and all the things that make life easy and comfortable.

The settlers had nearly three thousand miles of rolling ocean between them and home and safety. In those days this meant a voyage of about two months. Around them were great forests which reached they did not know how far. They were afraid of the Indians and of the wild animals, and they always had that fear which is the worst of all: of the things imagined but not seen.

Men who have lived in the wilds will tell you that there is no dread which tests the courage so severely as the dread of the unknown. The settlers were like children compared with the men of to-day. They believed in witches and in all sorts of strange creatures which never existed. So they had to fight against the fear of horrible, unnameable enemies and dangers, which all of us suffered when we were little, and it was dark or lonely, and there were no grown folk about.

Of course, the settlers suffered greatly from not having the tools and stores and equipment they needed. They came from England, which was even then an old country full of people. They knew very little more about how to take care of themselves in the woods in a new country than a group of city boys would know, if they had to go back into the mountains in the West, or even in the Adirondacks, or the South, and live in camp without any one to show them how. But they had a high purpose, and courage which did not fail. So they won through, and founded this Nation and earned a greater reward than we can ever pay. All we can do is to remember them and to learn all we can about them.

The Indians Then and the Indians Now.

Of course, Indians were the worst danger. When Columbus discovered America the Indians were friendly. They thought the ships with their great white sails, like big birds, were strange visitors from another world, and it is said that in the beginning the Indians brought fruits and other gifts to the discoverers. But later when wicked white men had deceived them and cheated them, the Indians grew less and less friendly, until there was war between them and the settlers. So they came to look upon white men, and white women and children, as enemies to be killed in the cruel Indian ways.

In those days, when a man traveled any distance from his own little settlement he was seldom safe from lurking bands of redskins who kept themselves hidden in the woods — no one knew just where. Now and then the Indians were more daring, and would attack the settlements. Some of the bravest fights in history were made by those staunch men and women, armed with flintlock muskets, who held their little log houses for many days together against the painted, naked Indians who swarmed in the woods around.

Many people think there were a great many more Indians then than there are now. But those who have studied Indians and their history, and who know most about them, tell us that there are almost as many Indians in the United States to-day as there ever were. The difference is that to-day the Indians are held on what are called "Indian Reservations," which are usually great stretches of mountain land in the West, given them by the Government. Were the Indian Reservations all together, they would be nearly twice as big as the State of Virginia. On these Reservations, there are about three hundred thousand Indians, and their number is slowly growing larger.



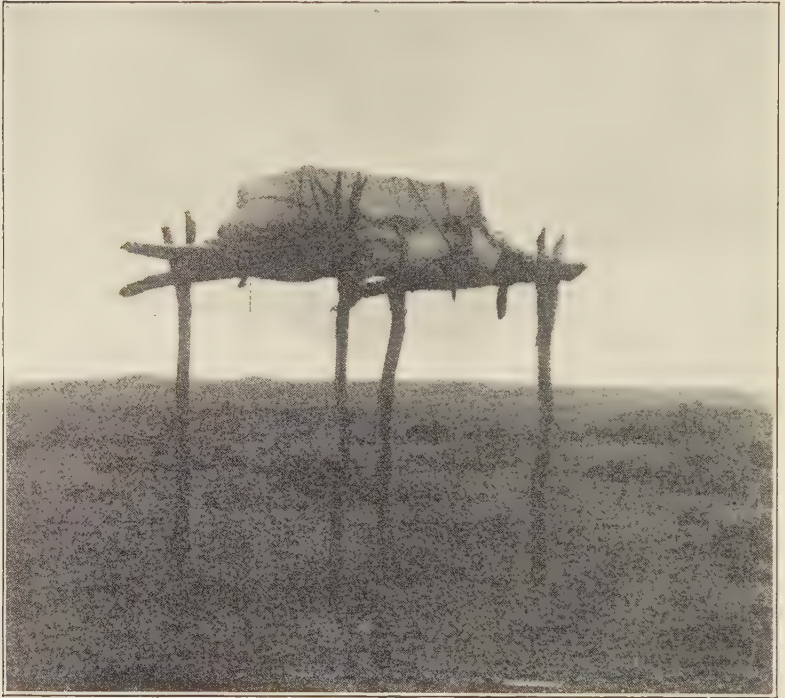
The happiest Indians are working their own little farms



From photo, copyright, 1906, by R. A. Throssel

The Indians have had a very sad story

The Indians call the President of the United States "the great white Father," because our government does everything for them that a good father does for his own children. It teaches them in Indian schools, and feeds and clothes them until they are able to earn their own living. The happiest,



From photo, copyright, 1907, by R. A. Throssel

An Indian burial scaffold

thriftiest Indians are those who are working their own little farms which the Government gave them, as many thousand of them are now doing.

If this were a book about Indians, there would be many interesting things to tell you. We are apt to think of Indians only as savage red men, who like to scalp people

and to torture them in other ways, and who deserve no kindness from white men. We have all heard the story of the old Indian fighter who said that the only good Indian was a dead Indian; and probably he had some reason for saying so.

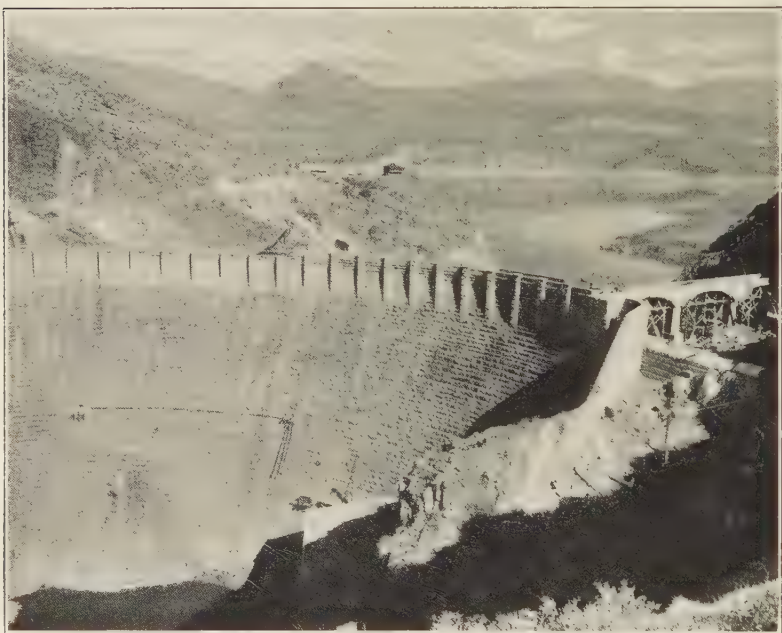
But the Indians have had a very sad story. We took their country away from them, and, while we tried to treat them fairly afterwards, we made many mistakes, mainly because we did not understand the Indians themselves.

For a long time the Government made the same kind of blunders in handling the Indians that a man would make who had taken care of a herd of quiet, friendly Jersey cows, and who was obliged, without any other training, to manage a whole zoo full of lions and tigers and other fierce wild creatures. It would be hard on the man, and it would be very hard on the beasts.

The Indian did not take to the white man's work willingly, because it was all new and strange to him, and because the spirit of work, as we understand it, was not in him; but he did take to the white man's vices, especially to whiskey, and for many years what people had come to call "the Indian problem" looked quite hopeless, although the Government went on spending many million dollars each year trying to work it out.

Now we have men in charge of the Indian Office at Washington and of all the Indians and their Reservations, and really of their lives, who understand the Indians, and who are working the Indian problem out little by little, but surely. They are doing it by treating the Indians like what they really are — like children; by punishing them when they are bad, and praising them when they are good, and by being firm and patient with them, and by protecting them so far as possible from wicked white men who would steal all that the Indians have, if they had their way. Some of the Indians are fast learning the white man's ways. The work of build-

ing the great Roosevelt irrigation dam in Arizona was done largely by Indian laborers. This dam was put up by the Government, to supply the water needed to turn the desert into farms in that dry country. The Indian builders were Apaches, who used to be among the most cruel and the most



The Roosevelt dam was built chiefly by Indian laborers

idle of all Indians. So as you see, the Indian problem is difficult, but it is far from hopeless.

A Picture to Remember.

But we must not forget that we are going to make a trip with the settlers. And we must keep a clear picture in our minds of America when the settlers came to it.

This is the picture we are leaving — a little group of



From photo, copyright, 1910, by R. A. Throssel

The arrow maker. The arrows with which the Indians used to kill their game are now made and sold as curios

men and women, the men dressed in queer steeple-crowned hats and plain gray clothes, and the women in clothes no less simple and serviceable — we have all seen pictures of them on Christmas cards and in Thanksgiving stories. We see these first Americans living in clusters of rough log cabins, with holes cut in the logs to put their muskets through; and around the cabins a narrow strip of cultivated land with the fire-scarred stumps still sticking in it; and back of the clearing always the great forests.

A little band of brave men and brave women — so few that altogether they would not fill what we call a village to-day — and around them stretches a vast country full of undeveloped riches, offering great opportunities, and bristling with obstacles and dangers — that is the picture which every good American should remember always.

The Journey.

But now we must get ready for our journey with the settlers. It may have been planned in search of gold, or of new lands to settle upon. But it is more likely that it was merely to look out the new country to the westward, to meet what came, to come to hand grips with the unknown face to face — a journey made in the spirit of the true adventurer.

First the start — the good-byes at the cabin doors, the going away in long Indian canoes and bateaux. To those who were left behind the farewell meant no less than it would mean to you now to see your father or your brother or your friend start on an exploring trip to the frozen North or in the wilds of Africa. It was said to men whose return was not certain.

And so they leave, paddling and poling up stream from the little landing until the bend of the river hides their laboring figures.

The long journey has begun. Every mile of it, after the

first few days, is through an unknown country. It is a journey ever westward, first up the broad, placid rivers which wind through the wide, flat strip along the coast, then into the hills which lie just east of the Alleghany Mountains, and then up and among the mountains themselves.

Days and weeks go by, but the travelers never see a clearing — nothing but trees. At first, the ascent of the river leads them through great stretches of open pine woods, where the sunshine sifts down upon the red-brown trunks. There is no underbrush, and the ground is grassy or covered with pine needles. This is cheerful, easy going, for the current is slow, and the country is more like a park than a wilderness. Game is plentiful, and deer are easy to see and kill through the wide openings between the trees.

Then come the foothills. On clear days they begin to see the shadowy blue outline of distant mountains. The woods are changing from pine to oak, ash, tulip, and maple. In the coves and along the clear rocky streams, the beautiful rhododendron, with its big purple blossoms, reminds them of the English flower gardens they used to know.

The hills are now growing higher, and the slopes steeper. The mountains are no longer hazy against the sky-line, but loom up near and high above them. The trees are bigger, the forest is darker and denser. The settlers forsake their boats, for the rivers are no longer wide and placid, but noisy little torrents tumbling down the dark, narrow valleys into deep pools where the big trout love to lie.

The settlers climb one range of mountains after another, and from the crest of each they look westward to the next, across a green sea of tree tops in between. Never a sign of life but the wood creatures — never a house or a clearing — always the same great green mantle of forest covering hills and valleys and mountains to their crests.

The nights are raw and cold, and the going is hard. Be-

sides, it is Indian country, and the thought of enemies they know are near, but can not see, is always heavy upon the settlers' minds. Every day has its fresh difficulties, like avoiding or holding off roving bands of Indians, killing meat for food, and working out the best course for the next day's travel. The well-earned sleep is always on the ground under the open stars.

The crest of the mountains is won, and the streams begin to run westward instead of toward the east. If the settlers are so lucky as to find friendly Indians from whom to buy canoes, or are themselves equipped to build them, or hew them out of logs, they again take to the rivers. If not, the slow progress afoot through the trailless forest goes on.

At last they stand in a noble valley, and beside the broad, splendid river flowing through it—the “Messa-sebe,” as the settlers called the Mississippi by its true Indian name.

Home Again.

Three months, at best, brings the settlers back, bronzed and corded and travel-worn. They wear make-shifts of buckskin, their beards are long, and their bodies are bent by the toil of the trail. They are fewer than before, and they tell, tenderly as only brave, big-hearted men know how to tell, of comrades killed by Indians, or by sickness which they lacked medicine to cure.

But the men who return have stirring news of the vast country to the westward, of the great mountains and their minerals, and of the rich black soil in the wide valley beyond. The stories fire the listeners, and plans are laid for new journeys, and to take up land, and for treaties with the Indians, under which men may live in peace—and so what we call civilization spreads ever westward from the cabins, along the paths first trod by those true adventurers.

CHAPTER II

AMERICA TO-DAY

NOW we are going to take another trip and see what has happened in three hundred years.

What a little thing now is a trip from the Atlantic coast to the valley west of the mountains! To-day one can cover in eighteen hours the thousand miles between New York and Chicago, and be as comfortable as in one's own home. In an hour's travel over the smooth roadbed, the train roaring forward at a mile a minute, so smoothly that the passengers can read or sew or sleep or dine without difficulty, we go further than the settlers went in a whole week.

A week for them, an hour for us — a week full of hardships and peril; an hour of rest and pleasure.

Another Journey.

We do not start in canoes as we did with the settlers, or step from root to root to keep dry shod as we trudge forward over the moist, mossy forest floor, our backs bent by the packs we carry. We take a car or a taxicab through the busy New York streets to the depot, and perhaps we hurry through it without realizing what a wonderful building it is.

It covers seventy acres. It has track room for over a thousand cars, and any one of the hundreds of trains which leave it every day would hold all the white men there were



Photo by Underwood and Underwood, N. Y.

Through the busy New York streets. Fifth Avenue

in America three hundred years ago. This depot is nearly two hundred feet from floor to roof, and five regiments of soldiers would not crowd its great spaces.

And so we make our start, seated in a luxurious steel house, which is what the modern Pullman car really is, leaning against yielding cushions, and looking through plate glass windows at a more interesting moving picture than we could see in any theatre. There is no interruption to change the films; and then the picture is all true.

But before the pictures begin we pass for a few minutes through utter blackness, after leaving the great, brilliantly lighted station. If we could only see a moving picture of what is happening then, it would look something like this — first, the broken, cliff-like outlines of the great buildings on Manhattan Island against the sky; then the choppy surface of North River, roughened by the breeze, and alive with craft — toy-like steam yachts, all paint and brass and awnings; busy, beetle-like ferry boats; and, maybe, moving slowly to her dock, in charge of several bustling, straining little tug boats, is one of those floating hotels, nearly two hundred yards long, which we call an ocean liner.

Then comes the hundred feet or so of water between the surface and the bottom, with a life of its own, as the use of hook and line will show you; then the mud and ooze of the river bed; and underneath it a tube of steel stretching from bank to bank along the bottom. In that tube is our train and ourselves, and perhaps it is better we cannot see it all, for it might frighten us. But really, thanks to the care with which the wonderful work was done, we are just as safe as if we sat in a boat above, or in one of the great buildings on the river bank.



A floating hotel, nearly two hundred yards long

The Open Country.

The tunnel passed, we have perhaps twenty minutes to travel before we get beyond the zone of smaller cities which fringe New York, and out into the open country from which the cities are fed.

We look for the great forests the settlers knew. They are gone, and all that is left to remind us of them are little patches of trees here and there, on rough ground and in swampy places between the fields, that have grown up since the original forest was cut down. Except for these the country is all farms, each with its little orchard, and its farmhouse among the shade trees, and the great barns nearby.

As the train rushes on into the hill country we see many farms whose buildings are unpainted, and whose puny crops straggle over steep hillsides; now and then we catch sight of the rock-strewn, barren acres of a mountain clearing, whose owner has left it to try his luck elsewhere. Dotted over such farms are often patches and clumps of little trees, which are the advance guards of the returning forest.

Now we are among the mountains. We see much more forest, but it is not what it used to be. Nearly everywhere we get glimpses of the cruel work of forest fire.

Sometimes the charred skeletons of trees stand along the railroad track, the soil burned to a crisp beneath them, with the raw rocks pushing through it. Where the fire ran more lightly the big trees are not killed, but the leaf litter is burned up, and the little trees are all dead. Where the fires burned many years ago we see the forest making its brave struggle to win back the land; striving for a foothold among the weeds and briars in the first round of a fight which will take a hundred years.

As the train rounds a sharp curve, we pass a side track on which stands a huge freight locomotive with a long line



Each with its little orchard

of cars behind it, piled high with lumber. If the window is open, we catch the clean, wholesome scent of the sap in the new-sawn boards.

At the end of the side track is a sawmill, humming musically as the great saws bite their way through the big logs. All is bustle. Men are wheeling lumber in little handcarts from the tail of the saw out into the piling yard. Other men



Charred skeletons along the track

are dumping logs from flat cars, and an endless chain, with big catches like fish-hooks on it, is hauling them up into the mill. Other men are loading lumber into cars on the siding. It is a pity we have n't time to go through this sawmill, which would be well worth while, but we can't stop now.

Beyond the mill the train passes through the woods from which the mill is fed. Fire has run through many of the old cuttings. Looking at them now, it is hard to believe that a beautiful green forest ever stood on the land.

Even where the fire has not run, we see other things

which are not good to see. Tops of great trees are lying in a jumble on the ground, the path of their fall marked by small trees, smashed or borne down with them; here are stumps two or even three feet high, each with perhaps a foot of good log wasted simply because the loggers were too lazy to bend their backs and cut off the trees lower down.

If the train were not going so fast, we could see that not



In a jumble on the ground

only have the good trees been cut and the poor ones left, but that trees of the best kinds have been taken and the poorer kinds left standing to sow the seed for another forest. Over there is a cutting in which the big oak, ash, hickory, and the basswood have been taken, but the dogwood and soft maple are still there.

But now the train is running through broad valleys where the land is in meadow or pasture, or under the plough. We see many farms which are thrifty, the buildings and fences

neat, the animals in the fields fat and happy looking, the soil what the farmers call "in good tilth" — a warm, moist, fruitful blanket of earth in which to sow the seed.

But not all the farms are like this. Some of them, with their squalid buildings, rough-coated, lean horses and cattle, and straggling, stunted, weedy crops, are not pleasant to look at. On such farms we often see fields which evidently have not been worked for many years — neglected, grown up to bushes and briars, or even so long unused that there are straggling clumps of little trees here and there — fields whose soil has been so completely worn out that it no longer pays to work it at all.

Without slackening speed we now cross a stone bridge over one of the great rivers which the settlers had to wade or swim.

As we look down at the muddy, sluggish current, and at the raw, deep-cut banks, we wonder how they found this river beautiful. It is hard to realize that when they saw it its waters were clear, and its banks were made lovely as well as secure by great trees, with a dense mat of underbrush beneath them. But now the trees have been stripped away, and we can almost see the current slice off and carry away the soft soil.

As we follow along the river, we come to places where it has cut through its banks entirely and changed its bed, or even spread over wide, flat stretches of rich soil, turning good farm land into unsightly sand bars and hideous patches of sun-baked, sun-cracked mud. When we saw, back in the mountains, how fire and the careless use of the axe had injured the forests, perhaps we did not realize that many miles away — where we are now — we would see in this great river the direct results of forest destruction.

Forests are to streams what the storage battery is to the electric wire — the source of useful power, and energy, and

current in reserve. Take away the battery, and the wire is dead; injure the battery, and the current loses force and permanence.

When the rain falls on a forest, it spatters against the roof of leaves, and the heavy, hard-pounding raindrops are broken up into a fine, soft mist. Any one who has stood under a tree during a shower does n't need to be told that. When this mist reaches the ground under the trees, it falls on a soft bed of dead leaves. This bed has a wonderful power to soak up and hold water; and so the rain soaks slowly into the leaf litter, much as water does into a cloth, until it reaches the soil beneath. This is called the mineral soil, because it was made by the gradual wearing away of rocks of many kinds, which took more years than we can count.

The water slowly works on down through this mineral soil, following cracks and channels already worn by the action of water for thousands of years; continually starting new channels of its own, joining with other rivulets, and so forming streams and even rivers underground. It is these underground waters, finding their way to the surface on the mountain sides, and in the valleys, which make springs.

When the forests are gone, all this is changed. The sun beats down on the leaf litter, dries it up, and the wind scatters it, until only the dense, mineral soil is left, which bakes with the heat until it is sometimes nearly as hard as brick. When the rain falls on it, very little soaks in. The rest runs off down hill into the streams, carrying a part of the soil with it. We can see this going on in many places from the train. Over there is a bare hillside with great raw gashes and gullies worn in it by the countless little torrents of muddy water which have dashed down it after each hard rain ever since the forest was destroyed.

A little further down the river we see a tangled mass which evidently was once a large building on the river's

bank. But the river rose in flood a few years ago and swept this big mill away like a match box, to pile it up, a useless wreck of broken timbers, a little further down.

Below where the mill was we see the ruin of a bridge. The same flood which took the mill swept out the bridge as well.

A little further, just where the valley broadens and the river banks are low, we pass for miles through a sandy,



Over there is a bare hillside

barren stretch which must once have been farmed, because we see fences through it here and there, and also an occasional house. But there are no cattle or crops in the fields. When the river was last in flood it overflowed its banks and spread a film of sand over this rich farm land, or washed its surface soil away and gullied it beyond recovery.

The mill, the bridge, and the rich farms are the revenge taken by the river for what men did to the forests which used to feed it.

The train follows the river a long way, as trains so

often do, because the river has cut an easy path to follow through the hills, and we come before long to another mill. This one is far enough from the bank to be safe even from the highest flood. It is a great building, built of brick, but it has no smoke stack. Reaching to it is a huge pipe line which, if we had looked closely about ten miles back, we would have seen leading out from the river, at the head of



The revenge taken by the river

a long chain of rapids. This is a power mill; one whose work is done by bringing to bear upon great turbine engines the force of the water that runs through the pipe. The principle is the same as that of the old-fashioned water-wheel, but the water power is much more effectively used. When this mill was running it did the work of fifty thousand horses. Why has its work stopped?

There is certainly plenty of work for it to do, and it must mean great waste and loss to leave standing idle that huge mass of costly machinery.

After the flood in the spring there was very little water left in the watershed of the river, because there was no forest sponge, like the one you read about a while ago, to hold it back. So the river fell, until there was just a little trickle down the pipe line — enough to do the work of a few thousand horses instead of fifty thousand. It did not pay to run in on so little power, and the mill was shut down. So you see that floods are no less serious than the low water which follows them.

But there is still more to see. Further down the river we catch a glimpse of something stretching clear across it. It can't be a building, for it is level with the water in most places, or only a little way above it. As we come nearer we see that it is a tangle of logs, all mixed together like huge jack-straws, some sticking up in the air, others lying flat, but all wedged so tight together that they form practically a solid mass of wood. Evidently they have been there a year or two, for the bark has peeled off, and some logs are cracked open from the heat of the sun. If these logs were at the sawmill a little further down, which is standing idle for the want of them, they would be worth a lot of money. As it is, men are swarming over them, picking out a log here and there, and pushing it into the shallow current, but it is slow work, and the logs are so water soaked and sun cracked that they are scarcely worth saving. When they were put in the water to float them down to the mill, the river was high. But all the water ran off quickly because there was no forest on the mountains; and the result was that the logs stuck on the shoals in the river, jammed, and stayed there. Most of the labor spent in cutting them, as well as nature's work in growing them, is wasted.

There are other things we might see from the car windows, but these are the big things. We cannot see how

coal is wasted in the mines. Nor can we see the waste of the crops grown from the farm and the forest, or the waste of timber in its use.

We must Live within our Means.

What else do we see on this trip? Houses and people, and always more houses and more people; great cities in the making, and great cities made already; factories in the towns, factories on the river banks; mills sawing trees into lumber, grinding wheat into flour, everywhere wheels whirling to turn the products of forest and field and mine into things men need or want.

We can almost see it grow, this great nation. Here is a thriving village, where twenty years ago was a farm; there is a great city, where twenty years ago stood a village; here is a railroad, where a few years back was a country highway; there a great factory, giving work to a thousand pairs of hands, where used to stand the water-mill, where the farmers brought their sacks on horseback and left a part of the grain for toll.

Now there are in America nearly a hundred million people, while at the time of the Civil War there were only thirty million — that is how this nation is growing. Nor has it only grown big — it has grown great. It is a power in the world we live in, a nation with the greatest present and the greatest future that any nation ever had.

The same rules govern a nation that govern a boy or a man. If the boy or the man or the nation spend more than they earn, they do not get on and up. We have wasted and we go on wasting so much, and the number of people in America is increasing so rapidly, that we are fast using up what we have instead of using it wisely.

We are cutting down the timber nearly four times faster

than it is growing back again; we have enough coal in sight to last less than two hundred years; the time will soon be here when, unless we are more thrifty farmers, our soil will not grow all the food we need.

Not only the Settlers were Blind.

We have learned a great deal since the days of the settlers. We know as much more than they knew, about making use of all the natural wealth around us, as the settlers knew more than the Indians with whom they fought. It is hard for us to understand how the settlers failed to see the great riches all about them. They saw the game, the cool springs, the tall, straight trees which would make good house logs, the warm, sheltered coves which would make good cabin sites, and the rich ground below for the garden patch. Further than that they could not see, or only seldom saw.

The eyes of some of us are no less slow, but in a different way. We see quickly and clearly the natural wealth not yet developed in forests, and streams, and mines, and soil. We look eagerly for the rich veins bearing gold, or silver, or copper, because we know that men and money can be had easily to develop them into mines which will soon make us rich. We see the great prairies, not simply as places for game as the settlers saw them, but as rich soil which only needs steam plows, and harvesting machines, and push, and capital to make us rich almost as quickly as the mine. We see in the great waterfall not merely something beautiful, but we see also the chance to harness it by pipe lines and turbine engines, and make it produce electricity which we can sell to light towns and run street cars, and which will make us even richer than the mine or the farm. When we look at the big trees, which took hundreds of years to

grow, we do not see house logs in them; we see saw logs, and a harvest of dollars from the lumber which the saw logs will make.

We see the opportunity to turn into money things which we did not produce, and which will be needed in America as long as men live within it. The millions and even millions more of the hungry mouths and the empty hands of those who will follow us we do not always see. Some of us are so blinded by the shimmer of the easy gold to be had quickly that we fail to remember that we ourselves will certainly feel the pinch during our own lives if we do not stop wasting what we find and putting nothing back.

Of course it is not easy to understand that a nation can ever be in actual want, no matter how much it wastes. It is easy enough to see sometimes why the man in the next street wears threadbare clothes and why his children do not have all the things that we have. It is often because he cannot make those two ends meet which must meet before a man can be happy or of much use in the world. Before you finish this book we will go about this country together far enough and carefully enough to see that what this chapter has told you is true.

This nation must make both ends meet by living within its means. That calls for wasting less and producing more — for growing bigger crops, for so handling the forests as to improve them, for common sense and knowledge and self-restraint in our use, not only of what grows, but of the things which do not grow, like minerals and water.

To-day we are not living within our means. Until we do we are harming ourselves, and we are robbing those who will come after us.

CHAPTER III

HOW THE FOREST IS USED, ABROAD AND AT HOME

WE cannot take a train through the forests; it would not carry us as far as we want to go. So we will have to walk; and walking is much better anyhow.

In Germany.

One of the finest forests in the world is the Black Forest, in southern Germany. Let us go and see what it is like.

Here we are, on a beautiful macadam road, like the roads through the parks at home, which winds through a great forest of spruce, fir, and beech. It is a beautiful forest, dense and tall, and there are no dead or badly shaped trees in it. The ground is piled deep in leaves, but we do not see any rotten logs or broken limbs. It is as clean of dead wood as the road we stand on.

But here is a trail which leads from the road to the right, and winds in and out among the trees. Let us follow it and see where it goes. It takes us first through a big block of old forest. We know it is old by the size and shape of the trees. Besides, we hear the sound of the axe, and see, right over there is a gang of men chopping. This tells us surely that the forest is ripe to cut. But what queer-looking wood-choppers! They are not at all like our own lumberjacks back home. They wear red woolen caps with tassels hanging from the peaks, and velveteen vests with big silver buttons, and heavy top boots coming well to the knee, which fall in many wrinkles over the ankle. They are talking a

guttural German dialect, which is not a bit like the German we are taught in school. Still we can understand enough to learn something about the work these woodchoppers are doing.



A big block of old forest

They point out a big spruce over yonder, which has just been cut down. By looking closely we see on the stump near the ground a broad blaze stamped with a die. This is where the forester in charge of this forest marked the

spruce, so that when the woodchoppers came to it they would know it was ripe, and to be cut. See how close to the ground he marked it, so that there would be no doubt after it was cut down and the logs taken away, that he really wanted it cut. And see that big fir over there, cut off almost level with the ground. Not a bit of the tree has been wasted; even the branches as big as your thumb have been



The valleys make a carpet of many colors

tied into bundles and put into piles ready to carry away. See how carefully the tree was felled; it stood thick among other trees, but was thrown so skilfully that it did not break or scrape any of them.

But why has the bark been peeled from all the logs? It cannot be worth much, and it is no easy matter to scrape it off with those long-handled, curved chisels which the woodchoppers use. They tell us that this is done by order of the forester. It costs something, but it is necessary, they say, to prevent beetles from making nests under the bark

in the logs, and then spreading to the forest and even killing the trees. These Germans are wonderfully careful people.

We should like to stay longer with these woodcutters, but we must go on. They wave us a friendly good-bye as we follow the trail still further. Through the trees we catch a glimpse of the country around us, with its rich valleys and rolling hills and tall mountains in the distance.



Some of the roofs are thatched with straw

It looks different from anything we have ever seen. The fields are not big and fenced like those at home; and the farms are in such little patches of different crops that the valleys make a carpet of many colors, from the gold of the ripening wheat to the rich green of the alfalfa, the blue green of the cabbages, and the many shades of the plots planted to other garden crops.

In every valley we see a village and outlines of other villages in the distance. They look as if they had been built a long time, for the houses are not made of wood, but of

brick or stone, and many of them are covered with white-washed stucco. The roofs are red tile, or thatched with straw. In every village we see a church spire stretching like a landmark far up above the cottage roofs.

The forests are always on the steep upper slopes and crests of the mountains, and the farms on the lower slopes and in the valleys. Men seem to have found out here a long



Now the trail leads us by a forest nursery

time ago that it does not pay to strip the forest from the mountain sides.

Now we enter a different kind of forest. Nearly all the big trees have been cut, and the trail leads us through a thicket of little trees which have grown up where the old trees used to stand. They are nearly as thick as bristles in a brush. The forester has planted little trees to fill up the spots where the young trees did not come in of themselves; but on the whole this forest is reproducing itself. The old trees have been cut so carefully and gradually that the young

growth spread further and further as more and more light was let in by the cuttings, until now there is another forest where the old one stood. It is clear from what we see here that a man can cut his forest and start a new one at the same time.

Now the trail leads us by a forest nursery in which peasant women are at work, where we see several acres of little trees only a few inches high. The very little ones are in beds and the older ones in rows ready to be taken out and planted where they are needed.

But who is this, on the side of the trail, dressed in a green uniform, with big buttons made of deer horn, a rifle in a sling strap over his shoulder, and a dachshund at his heels? He tells us he is a forest ranger, and he is directing the work of many boys and girls who are setting out little trees so fast that you can almost see the forest grow as they work. The ranger seems to know his business, and the boys and girls behave as if setting out trees was great fun.

Elsewhere in Europe.

Since we have so much to see, let us take a short trip in one of those big German balloons, which will be a new experience for us all. Below us the land unfolds like a map; right under us now is the silver streak made by a great river. We are looking down on the great Rhine valley, one of the most beautiful in the world, and among the most interesting. The Germans have fought to hold it, and have written about it in poetry and in prose for many hundreds of years. We have all heard of it; of the ruined castles on its banks, and of the quaint old towns past which it runs. There are wheat fields with vivid poppies growing among the golden stalks, and vineyards on the hillsides and even on the rocky ledges; there are beautiful roads running

along the banks — roads smooth as a floor, and between them the blue river. Then there are forests — not the



The ruined castles on its banks

kind we saw in the Black Forest, but patches of what look like second growth. These are “sprout forests” of oak, which are grown by cutting down the trees when they are

young, so that each little stump sends up several shoots. Some of the shoots are cut off so as not to take too much strength from the stump, and in fifteen years or so there is a forest of shoots which is big enough to cut for vineyard poles and for hop poles, which are greatly needed in the Rhine valley.

When we land from the balloon we find ourselves in another kind of forest. We have dropped down into South-western Saxony, which is not far from the Rhine valley, but not a bit like it. This forest is all spruce, very much like our spruce trees at home. In the Black Forest we saw spruce reproducing itself under careful cuttings from self-sown seed, but here in Saxony they cut the forest clean when the trees are about six inches thick, which is before they bear seed; and so they have to plant trees to grow another forest. The reason this is done is because it pays best, and it is just as good forestry as what we saw in the Black Forest. Lots of paper is made in Saxony, and they grow spruce to make it of. Spruce grows fast until it is about six inches through, when it is big enough for the paper mills. After that it grows much more slowly. So they cut the trees when they are small, and it pays so much better than waiting until they are bigger, that the foresters can afford to go to the expense of planting up the land after the forest is cut off.

Here is a clean cutting of last year, but already the stumps have been grubbed out, and little trees have been planted in row after row about three feet apart, all growing sturdy and strong.

If we only had more time, we would go to many other interesting places in this wonderful country of Europe, where they take care of everything because they have found that it pays. But we cannot spend any more time abroad, for we have too much to see in our own country. If we were

all going to be foresters it would pay us to go not only to Germany, but to France and Switzerland and Russia, and study all their forest methods on the ground. But since we are not all going to be foresters, we have learned enough already to get the great lesson which the care of the forests in Europe teaches every one who keeps his eyes open — the lesson of thrift.

We have seen something of how they care for the forests abroad, and we naturally want to see, now that we are back at home, how they are handled in our own country.

In the Southern Pine Belt.

We will go South first, into the wide pine belt, which once covered the whole southeastern part of the United States between the Appalachian Mountains and the sea.

The forests are nearly the same throughout this whole region, except that hardwoods and shortleaf pine are more common in the northern part, while the longleaf pine is the chief timber tree in the Gulf States. These are the forests through which we first passed, on our journey with the settlers westward from the southern Atlantic coast.

The forest is always the same, except in the swamps and along the streams, where the pine gives way to the strange-looking cypress, with its trunk swelling out at the butt like a bottle, and its great roots called "knees" sticking up on all sides from the water until it looks as if all the roots were above ground instead of below. With the cypress are glossy-leaved magnolias, and gums, and many shrubs which we never see further north. They are weird places, are these swamps, with their dark water and ghostly cypress and heavy shade. No doubt they looked just the same when the settlers saw them, and for many thousand years before.

Between the swamps are great stretches of sandy land

covered with open pine forest. There is little young growth or underbrush, and the ground is covered with pine needles, or with wild grasses when the forest is very sparse.

As we pass through the woods, we see something which we are not likely to understand, if we have never seen it before. Every tree on a wide strip has had a gash chopped



An old turpentine "orchard"

across its trunk near the ground, and for a couple of feet above the gash the bark and a good deal of the wood have been hacked away. Here the turpentine "orcharders" have been at work. The crude gum, which is simply the sap of the longleaf pine, bleeds freely from the wound or "blaze" and trickles slowly down into the gash below, which has been so made as to form a little pocket for catching it. Then men come and dip out the resin with ladles, and haul it away to

little turpentine "stills" in the forest, where it is cooked, to make turpentine and rosin.

We see some of the older turpentine "orchards," in which the trees have been blazed on four sides and then abandoned. Fire has run through them, and evidently burned fiercely on the pitchy, blazed wounds of the trees, for many of them



The log loader at work

have either been burned off at the stump, or burned so nearly through that the next wind blew them over. These turpentine orchards look a good deal like a corn field, after a herd of cattle have broken through the fence and eaten their fill, and wasted in stalks trampled and crushed a good deal more than they have eaten.

We board a log train, which takes us from the turpentine

orchards into the cuttings. How different they look from those we saw in Germany! Instead of the little gang of woodchoppers, we see many groups of men at work — most of them negroes — felling trees, cutting them up into logs, laying a spur from the railroad track on which our train stands. They are also operating a queer-looking engine mounted on a car. The engine puffs rapidly and moves a long steel arm like a crane, which is lifting logs and loading them on other cars as easily as you would pick up a stick of firewood.

This machine is well worth watching for a while. It looks a good deal like the steam shovels we have seen at work where much dirt is being moved, as on railroads and the sites of great buildings. Running out from this log loader, for that is what it is, is a long, flexible wire rope. We see a boy mounted on a mule, hauling this rope or cable out into the woods. On the end of the cable are two big hooks, which the lumbermen call a "pair of tongs." The mule stops at the end of a big log in which a man fastens the tongs. At a signal the little engine begins puffing away and pulling in the long cable with the log fastened to it, by winding the cable around a big steel cylinder which looks like and is called a "drum." As soon as the log is at the side of the loader the tongs are loosened and the big crane swings around until it is over the log, into which another pair of hooks are fastened; then at another signal the log is lifted high in the air and gently let down on a flat car. In order not to have trouble changing cars all the time, the loader is sometimes built so high above the car on which it rests that flat cars can pass beneath it as they are loaded.

When we see all this we are quite proud of American cleverness. But when we get out in the woods from the railroad track, we do not feel so proud.

In the woods we do not see so much waste of the timber

itself, because, after all, it is easy to get this timber out, and the market is so good that it pays to take the most of it. But here and there we do see some high stumps, and some logs which might have been cut out of the tops, but which have been left to lie on the ground and rot. The great waste is the waste of the forest. No trees have been left standing to sow seed for a new forest, and the only trees which have not been cut are those which the lumbermen cannot sell very profitably. The result is that much of the land has been cut clear. Fire has evidently run over it almost every year. The ground is so bare that the fires have not been very hot, but they have scorched the few remaining trees at the butts and killed some of them. They have completely destroyed all the little seedlings, and the trees from five to twenty feet high have been stunted by repeated scorching. Another result has been burning up the needles and mould underneath, so that the ground is now covered with tough, wiry broom sedge, in which tree seeds do not sprout and grow well.

It is clear from what we see than on much of this land trees will have to be planted before the forests will return; and even where the little trees are creeping over the clearings they are coming back so slowly that it will not be less than one hundred years, and probably longer, before they will be big enough to cut. It looks like a great pity because the land is sandy and very little of it will make good farming land.

Among the Douglas Fir.

It is a long jump from the South to the Northwest, but we must not fail to see one of the great western forests. So now we will go to far-off Oregon, and into the beautiful Cascade Mountains. This is a totally different kind of country from anything we saw in Germany or in the South. It has very steep slopes and narrow valleys, and the trees are



In the beautiful Cascade Mountains

enormous. There are great hemlock and Douglas fir and spruce — some of the fir are eight and ten feet through. We have to look nearly straight up in the air to see their tops, over two hundred feet above us, as high as a twenty-story building. The ground is covered at least a foot deep with the mould from many centuries of leaf fall, and moss-covered logs lie thickly upon it.

This is a very hard country to travel in — the roughest by far we have yet seen. The underbrush is so thick that we can hardly break our way through it, and we strike patches of what is well called "Devil's Club" — a tall bush with big leaves from whose under side grow long, sharp spikes, which tear our clothes and even our flesh if we are not careful. This must be a very rainy country to make such great forests and such rich growth everywhere.

As a matter of fact, Washington is the rainiest country in the United States, and we shall be lucky if we get out of the woods without a wetting.

We go into the woods on a log train just as we did in the South, but this time the track winds in and out, up steep grades, through narrow, shut-in valleys, and finally stops simply because no self-respecting train could go any further. At the end of the track a steep, deep-cut valley runs off to the right, at the mouth of which is an engine which looks like the donkey engines we have seen loading vessels with cargo.

Stretching up the valley is a sort of trough called a "chute," made of logs, from which the bark has been peeled and which have evidently been greased, because they are slick and shining. As we watch the little donkey engine, it gives a whistle and we see a cable lying in the bottom of the log trough, or "chute," tighten up until it is as taut as a bow string. It begins to wind in on a drum, which is part of the donkey engine, and soon we see several great

logs coming down the trough hitched together by hooks, with the cable chained to the front one. The logs are



Pulling logs down the chute

pulled in to the side of the track, which is on a level with the flat cars, so that they can be loaded easily. No log loader such as we saw in the South is made strong enough to

lift these great sticks of timber, some of which are twenty feet long and eight feet through at the butt, and weigh as much as twenty horses.

But if we want to see the trees come down, we must walk up the "chute" for about a mile. On the way we pass several other donkey engines, about a quarter of a mile apart. It is clear that one of them can't do the work because of the strain on so long a cable, and that each one has to pull the logs a certain distance, when they are attached to the cable leading to another "donkey." We constantly meet logs on their way down to the track. When the slope is steep, they slip along so fast as nearly to overrun the cable, and others we see being pulled slowly up the other side. We have to be careful to keep clear of the cable, for where it crosses a ravine, it often switches up into the air fifty feet or more as it is tightened. If we were caught by it, we would not see any more forests.

Here is the last donkey engine and over there we can see the loggers at work. There is so much that is strange to us that we hardly know where to begin. There are two men felling a Douglas fir, which must be eight feet through and over two hundred feet high. Instead of working on the ground, they are standing on spring boards, stuck into notches in the side of the trunk several feet above the ground. They are doing this to avoid cutting through the thick stump lower down, which means much waste of timber in the stump. On the further side of the tree is a great notch so long and deep that two men could lie in it, and the loggers on the spring boards are sawing through the tree toward the notch with a huge two-handled cross-cut saw. As luck will have it, their work is nearly over, and a few minutes will see the tree come down.

It does n't look as if this huge column of timber, half as high as the Washington Monument, would ever fall. But



There are two men felling a Douglas fir

even now the sawyers yell "Timber," and climb hastily down from their spring boards. Suddenly from the big tree there is a crack sharp as a pistol shot, made by the parting of the fibers deep in its heart. Crack! Crack! Crack! the reports continue; and now we see the top of the tree beginning to move. At first it moves very slowly, but soon goes faster and faster, and now the cracks are like the reports of a small cannon. As we run aside out of danger the great tree crashes through the tops of other trees, filling the air with flying branches and even limbs as thick as your body, as it smashes to the ground. The earth trembles, for the big trees, like the big animals, die hard — like the whale in its death flurry, or the fall of an African elephant with an ounce bullet in its brain.

Around us are other forest giants, over which men are swarming like ants; some are sawing the huge trunks into logs, which is sometimes the work of a day to each cut; others are peeling off the bark, not as a safeguard against insects, as we saw done in Germany, but simply to be rid of this extra weight when the logs are moved. Winding in and out among the logs we see a wise-looking gray horse, who hauls behind him a wire cable to the end of which a pair of great hooks are fastened. Now we see a man driving the hooks into the end of a log. The man calls out a signal, the donkey engine whistles, the cable tightens, and the great log begins its long journey first to the top of the chute and then to the railroad track. Again we must be careful because great danger lurks about the cable; it necessarily makes all sorts of strange angles, as the horse hauls it between and around the logs; and as it tightens it sometimes sweeps over a space of fifty feet or more. To be struck by it would be a good deal like being hit by one of the big branches broken off when the great tree fell. There is still another danger we must be on guard against, for the hooks sometimes pull

out of a log, and then the cable whips madly all about, before the engine can be stopped.

We cannot help feeling great admiration for the men who are doing such difficult and dangerous work. As a matter of fact, it is not at all like ordinary logging; it is much more like engineering to handle such huge weights under such conditions.

But we cannot admire the waste we see all about us. There is enough wood left in stumps and in logs and timber in the tops of trees to make, acre for acre, several times what the careful Germans harvest by clean cutting their beautiful spruce forests in Saxony. But that is not the worst of it, for as we climb in and out of the steep little canyons we come to the cuttings of several years ago. Here the fire followed the lumbermen as it so often does, and left a sad picture. The tops were too big to burn up clean, but the ground was scorched bare right down to the rocks, and over it, in a miserable jumble, lie the huge charred skeletons of the tops of the great trees. If we went further through the old cuttings, we would find in the older ones that the trees are coming back again, for the Douglas fir fortunately does not need vegetable mould to grow in. But they are coming back very slowly, and there are great blanks here and there, too far from standing trees for self-sown seed to reach them. The definite impression we take away is that part of this waste may be necessary, but that most of it could be avoided profitably if the lumbermen knew how quickly the land they log could be made to grow trees again through the use of less destructive methods.

Logging in the North Woods.

Perhaps it is not fair to judge all lumbermen by what we have seen in the South and in Oregon. So let's look at

another forest, far away from either. To northern Maine is another long jump, but we are getting used to that.

It is winter time and the ground is under deep snow. The forests are like those we saw in Oregon, but the trees are much smaller. Here the spruce is only about two feet through, and the fir is smaller still, and seems to grow mainly in the swamps. Scattered among the spruce, on the higher ground, are northern hardwoods, yellow birch, maple, and beech; while lower down we find soft maple and some ash,



We begin to meet sleds piled high with logs

and in the swamps the tamarack. But small as the trees are, the forest is beautiful, constantly changing in type as we trudge from swamp to flat and slope and hilltop. Now and then, particularly on the edge of swamps and in the little natural meadows, we see the sharp-cut run-ways made by the hoofs of deer.

Already we hear the musical swish of the cross-cut saws, which means that here, too, men are harvesting the forest crop, as they are doing everywhere where forests and men are found together. As we get nearer we see frequent signs of what is going on.

Here is a road cut through the trees, and it looks as if the

snow had been leveled and water had been poured on top and allowed to freeze, for its surface is smooth as glass. Along the side of this road are stacks of logs, and we begin to meet loaded sleds pulled by two to four massive horses, like the horses we see hitched to great trucks in the cities. It must be ticklish work to drive a team with such a load



The camp is the loggers' home

over such a road. Where the grade is steep we notice that hay has been scattered over it, so as to keep the sleds from running against the horses and killing them, and perhaps the teamster too. We meet more and more loaded sleds, all going the same way, and pass many stacks of logs, at which the loading is going on.

Soon we reach the cuttings, where they are felling spruce, hemlock, and balsam, down to such small sizes that we wonder what they are going to do with them. The fore-

man says they will be used for making paper; so this is the same kind of work we saw going on in Saxony. But it is not being done in the same careful way. Our Saxon forester would never forgive those high stumps, and whoever left those logs in the fallen tops of the trees would be sure to get



Dinner in a North Woods logging camp

into trouble. He would be still more provoked by the reckless way in which the trees are cut down. The only object seems to be to get them down as quickly as possible. As we pass along we see many cases where trees which were so felled as to smash down clumps of young growth could have been dropped quite as easily into a road or where the ground was bare.

The greatest waste of all is not of the timber, but of the forest itself. It is the same kind of waste we have seen, or perhaps we have shared in, when a group of boys find a young cherry orchard with the fruit dead ripe, on a bright



We might go into the Lake States

day in June, and with nobody around, and then shinny up the trees and break and tear off the limbs, and make destructive little animals of themselves generally, so that they can get all they want the more quickly. It is one way to get the cherries, but it is n't the best way for the orchard. The lumberman's way is even worse.



Getting cypress logs out under difficulties

Not the only damage to young growth is through careless felling. We see big, active horses, which are wise looking like the "lead" horse we saw in Oregon, with singletrees behind them, to which big hooks are fastened for pulling out the logs. These horses are yanking the little logs out to the log piles. It is rough collar work, and of course they trample down much young growth as they go. No one seems to care; it is clear that if the young trees survive, it is only by accident. These lumbermen seem to think that the only trees worth anything are those they can cut now, and saw into logs, which is about as reasonable as to say a calf is not worth anything until it is a cow.

It is the same story when we get to the old cuttings — the same story of fire, of soil burnt bare, of a jumble of charred tops; of land suitable only for growing wood, made useless for perhaps a hundred years. It is such a sorry picture that we would scarcely be willing to take the land for a gift if we had to pay the taxes on it.

When we think of what we saw in Germany, of the systematic, careful, skilled harvesting of the forest crop there, and of the new forest growing up through the wise use of the axe, we wonder why we waste so much at home.

The Same Nearly Everywhere.

We might go into the Lake States, into the Southwest and into the Southern mountains, but we cannot spend all our time seeing lumbering. Besides, we do not need to go further. We would see the same kind of work and waste nearly everywhere.

We would see work often admirable in its organization and its enterprise, and in the ways Americans have worked out to get logs out of difficult country cheaply and fast; but nearly everywhere we would see waste, much of which is



Norway is overcutting her forests, like ourselves

real waste, because it is unnecessary — waste which a few cents more spent on each acre logged over would prevent.

This waste seems great to us, even in the few places we have seen. Think of what it amounts to in one year, when



Japan is growing trees to plant

we consider all the forests of the United States together. There have been many years in which forest fires burnt up even more timber than was cut and used; and for the last fifty years the average loss each year from forest fires, counting only the timber actually destroyed, is about fifty

million dollars. If we took account of the little trees killed, the loss would be far greater, for these little trees, which if protected would grow into another forest, are no less valuable than the ripe timber.



India buys more wood than she sells

We must Grow Timber or Go Without.

We have wasted so much timber that we are already put to it to find enough to meet our needs. We are using up the forests nearly four times as fast as they are growing back again, and the ripe timber now standing will not last more than thirty or forty years. After it is gone we shall have nothing but second growth left. The more carefully

our logging is done, the more second growth we will have when the pinch comes, provided we protect it from fire.

But if we go on wasting our forests and leaving cut-over lands like those we have seen in the South and in Oregon and in the North Woods, then the end of our mature timber will not mean timber scarcity, but real timber famine, which would bring with it suffering only second to food famine.

We cannot expect to get enough timber from other countries. Taking the whole world together, it is using quite as much timber as it produces. If we are to have wood straight along, out of which to build houses and railroads, and for firewood and all the other daily uses for which wood is needed, then we must grow our own supply or we must go without.

We have seen what most lumbermen are doing, and it is not encouraging. Now let us go elsewhere to see if we can find anybody in the United States who is handling the forests in the right way. If we can, and if what they are doing really pays, then the situation is far from hopeless, because what one man does profitably others are sure to do sooner or later, although they may be slow to take it up at first.

CHAPTER IV

IN A NATIONAL FOREST

HERE we are in the Cascade Mountains again; the same country in which we saw the donkey engines, and the big trees coming down.

We go into the woods over a carefully laid out trail, with easy grades, wide enough for pack horses, and out of which all fallen trees have been cut.

After the trail crosses the first high ridge it soon leads down to a cheerful little valley, at the widest part of which we see the beginnings of a farm. The forest has already been cut down; there are a few acres under the plow, and a good garden patch; and a strong log cabin, which begins to look like a home, with its patch of bright flowers in front of the doorway, and the smoke curling out of the chimney.

We are in one of the great National Forests; but what is a farm doing here? There is the rancher behind his plow, and perhaps he won't mind checking his struggle against the stubs and roots of the new ground long enough to tell us how he came to settle here.

"Yes, this is a National Forest," he says. "There are about a million acres in it; and they tell me that the Government has nearly two hundred more great forests scattered among the mountains all the way from Mexico to the Canadian border, up and down the Rockies, the Sierras, and the Cascades. I believe there are a few back East, but not many.

"These great forests are under the care of the Government, but they really belong to the American people — to



We go in over a carefully laid out trail

you and to me, and all the rest of us. The Government is handling them so that we will all get benefit from them, and not only we ourselves, but our children. That means that all the land is put to its best use; and so the law lets a man settle in the forest, if the land he chooses is good enough to make the farm a home.

"How is the Government doing all this?" we ask. "Well, that is a long story," says the rancher. "I think it would interest you to ride over this forest and see it for yourselves. There comes one of the rangers; he is going up the trail, and you might ride along with him. He can tell you all about it."

While the rancher is speaking, there comes riding up the trail a man in a broad-brimmed hat, whom at first we take for a cowboy, from the swing of his shoulders and the way he sits his horse. But this man wears a neat, serviceable uniform of dull green cloth, and pinned to his shirt underneath his open coat is a little bronze badge which puzzles us at first; a little later we get a close look at it, and we see on it a pine tree in relief, and above it the raised letters "Forest Service." The ranger says he will be glad to have us ride with him and to tell us all he can.

We take to this ranger from the start. He talks clearly and frankly about his work, and he looks to be very much a man. As we jog along he points out many things as we pass them, and he never laughs at our questions, "tenderfeet" as they may often show us to be.

A Busy Job.

"Yes," he tells us, "I work for Uncle Sam — not because he pays me well, for a man with a family cannot save much money and keep the two horses needed for his work at twelve hundred dollars a year — but I like the work because



"I believe there are a few back East," says the rancher, "in the Appalachian National Forest, which the Government is buying as a great reservoir of timber and water

I believe in it, and because we are succeeding, and I like the men I work with. They know their business, and they are working for other people and not for themselves.

"My job? Well, it's a fairly husky job. I have charge of about a hundred thousand acres which is called a district, and over me is the supervisor, who has charge of the whole forest. I live in the woods most of the year, in a little cabin which the Government built; I hope you will eat supper and sleep there to-night."

"But what kind of work do you do in this great district?" we ask.

"It is part of my duty to see that fires don't get into my district," says the ranger. "Every day during the fire season, which lasts from about May until late in the fall, I ride the trails on the lookout for fires. If I see one I have to drop everything else and hike for it, which may take a couple of days, for one can see a great way off in these mountains, and the going is hard. Then I have to look after timber sales, for the Government is selling timber here, and it has to be cut carefully so as not to injure the forest.

"I have to watch the sheep and cattle which are grazed in the forest, and see to it that they are kept in the territory assigned to them, and that the range is not overgrazed."

We are thinking that the ranger has his hands full if he does all these things, but he goes on.

"There are many other things. If anybody wants to use anything in my district for any purpose, — and the Government encourages the use of this forest in every way which will not destroy it, — I go over matters with them on the ground, and I give them a permit. Some people want to settle in the forest, like the rancher back there in the valley, and I have to find out whether the land will really make a good farm, or whether it is so poor that it ought to stay under forest. People want land for camp sites, or to build

stores on, or for mines, and for many other uses. Some want to buy timber to saw up and sell, while many more want a little timber for nothing for their own use — and this the Government gives them, just as it lets the settler's milk cows graze without any charge. There are water-power men who want to run pipe lines, and to build plants and



They are fastening wire to the trunks of trees

develop power from the rivers in the mountains. These are some of the things, but there are many more."

Just then the ranger's horse shies and wheels, as he catches sight of a coil of galvanized wire in the bend of the trail. We pass several men stringing a telephone line. They are fastening the wire to the trunks of trees instead of stretching it on poles. It is the strangest-looking telephone line we ever saw.

"You will see a great deal in this forest that looks like rough work to you," says the ranger. "The Government does not give us all the money we need for improvements



“Trails and telephone lines are the best safeguards against fire”

in the forest. But if you lived here, and a forest fire was closing in around your home, you would be thankful if you could send a message for help over that roughly strung wire. These telephone lines between the settlements and the rangers' cabins and the lookout points on the mountains are worth many men. Trails and telephone lines are the best safeguards against fires—telephones to call in men, and trails for them to travel over with their pack horses and supplies."

The Cowboy.

As we ride on we see many signs to show that these National Forests are not solitudes. We pass cattle grazing in the valleys and on the lower slopes, and sheep grazing on the ridges and high up on the mountain sides. Both sheep and cattle are fat, and the grass is thick and strong.

We chat a few moments with a cowboy in charge of a big bunch of cattle, who looks much like our ranger, except that he wears different clothes. He does n't seem to have any grudge against the National Forest.

"In the old days, before these National Forests were made," he says, "the sheepmen and the cattlemen were always quarrelling over which should have the range. Sheep and cattle in some parts of the mountains do not do well on the same ground; cattle do not like to graze where sheep have been, for the sheep graze so close that they leave very little forage behind them.

"I could tell you true stories of range wars which would make you wonder how it is that men could kill each other over the question of whose stock should have the grass. This went on with satisfaction to nobody, and all the time the range got poorer. I guess what nobody is responsible for nobody will take care of. It was a race between the sheepmen and the cattlemen to see which could get their

stock first on the range in the spring, so that the new grass was trampled, and the range often ruined for that year, before the season had really begun. This kind of thing going on year after year put the ranges nearly out of business, and it was lean cattle and scrawny sheep that we used to drive down out of the mountains in those days.



“The Forest Supervisor puts the cattle on the lower slopes where they belong”

“Now it is all different. The Forest Supervisor runs this range, and he runs it right. He puts the cattle on the lower slopes, where they belong, and he puts the sheep on the high ranges where they do best. The result is that everybody gets their share, and the range is getting better all the time. These cattle I am in charge of will be so fat by the fall that they can go straight to the packing house in Chicago or Kansas City.

“I am for the Forest Service. It knows the country and it knows its business. In the beginning we all tried to bluff the Service, but it did n’t work. Now we have to kick some-

times to let them know we are not too happy, but if they knew how happy we really are, it ought to make them feel pretty good.

“It is true of the Supervisor of this Forest — and I guess the same is true of the whole Forest Service — that he always looks after the little fellow. The little fellow did n’t



“He puts the sheep on the high ranges where they do best ”

use to stand much of a show. This was n’t a healthy country for a man with a small bunch of stock, or for his stock either. The big man took most of the range, and he held it by the strong arm. Now that is all over and done with, and everybody, big and little, gets a square deal. For every permit on this forest for a man to run a big bunch of sheep or cattle, there are a hundred permits for the little fellow with only a few.

“That is n’t all the Forest Service is doing for the cattleman and the sheepman. It is trapping and shooting the

wild animals which make trouble for the sheep and cattle — the wolves, the bear, the coyotes, and the mountain lions. The rangers kill some of them, but the Forest Service also hires hunters who do nothing else. Every wolf or lion killed is worth a hundred dollars to the stockmen; for if he lived he would cost that much a year in sheep and cattle destroyed.

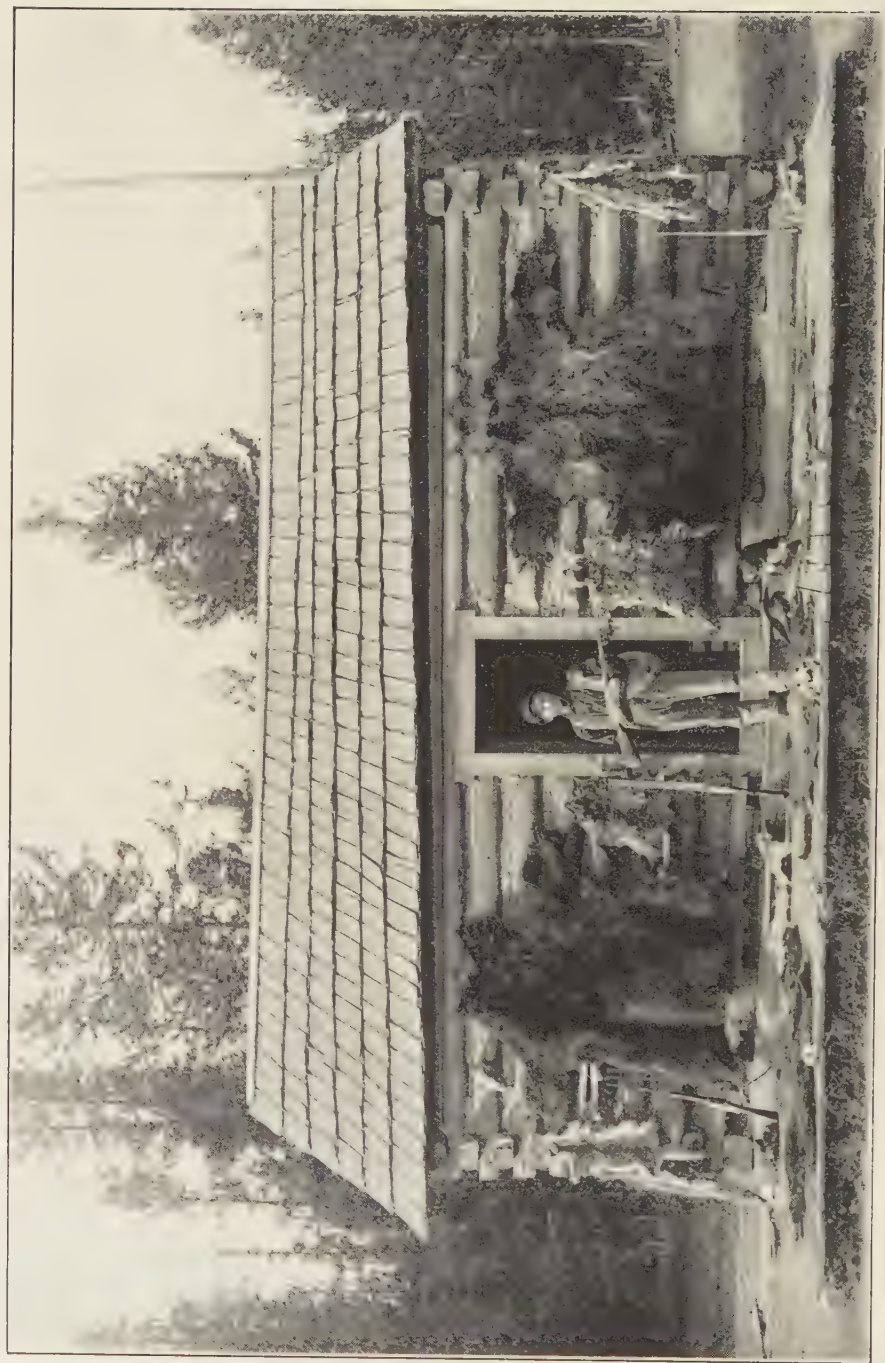


“Straight to the packing house in Chicago or Kansas City”

Of course, we are not telling everybody this — but what we stockmen pay in grazing fees is cheap, even if we only got rid of the wild animals, to say nothing of the better range we have under Government regulation. You will pass a hunter's cabin a little way up the trail. Take a look at the skins nailed up to dry.”

We leave the cowboy reluctantly, for like the ranger he knows his business.

“Of course, there are still a few kickers,” says the ranger,



“ You will pass a hunter's cabin ”

as we wind on up the trail; "and there always will be — but the only kind we are having any trouble with on this forest are those who want something they ought not to have. That kind of citizen is not hard to handle, so long as our superior



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We leave the cowboy reluctantly

officers at headquarters back us up; and they never fail to, in every case when we are right."

The Timber Sale.

"Now," says the ranger, "if you don't mind making a little side trip, we can drop off into the valley here to the

right, and see where lumbermen are cutting timber which they bought from the Government."

We follow down the north slope of the mountain, and soon begin to see signs of the cutting. The general methods of logging are the same as we saw before in the Cascades; but there seems to be a different purpose behind the whole work.



The brush is burned when the ground is moist

The stumps are much lower, no big logs have been left in the tops, and the trees have been thrown so skilfully that they have done very little damage. All the boughs and brush have been thrown together into piles, the big branches on the inside and the smaller stuff on the outside. These, the ranger tells us, will be burned when the ground is moist, or after the first light snowfall, when they will burn slowly and clean, and will not scorch the trees left standing.

Were it not for the keen eyes of the ranger, who points out a few places here and there where the cutting has not been so carefully done, it would all look perfect to us, as

indeed it almost is, in view of the actual conditions under which the loggers have worked.

Of course, compared with what we saw in Germany, it is very wasteful lumbering, but in Germany the whole tree can be used, the market is nearby, and wages are very low. The woodchoppers we talked to in the Black Forest got only



Or after the first snowfall

about thirty cents a day. These lumberjacks who are logging in the National Forest are paid from a dollar and a half to nearly four dollars a day, depending on their work.

The timber we saw being cut in the Black Forest brought fifty and seventy-five dollars a thousand board feet, and even the bundles of branches brought several times what it cost to gather them. The timber cut here in the Cascades — in this rough country where logging costs so much — brings only about fifteen dollars a thousand board feet; and if you tried to sell any one brushwood they would probably laugh at

you, or, still more likely, swear at you, or possibly they might do neither, but simply put you down as crazy.

One always has to bear in mind the conditions. Compared with the Black Forest, this lumbering is crude. Compared with the lumbering we saw on private lands in the Cascades, it is excellent work, which harvests the ripe crop carefully and wisely, which reduces the danger from fire, and which encourages the growth of a second crop. If all the forests in the United States were handled like this National Forest, it is clear we need not fear a timber famine.

How different the old cuttings look from those we saw in the Cascades before! The brush has been burned up clean, and we see a sprinkling of little trees which are fast filling up the openings. When we remember that this timber in the National Forest was bought and paid for at the market price, and that it will be sold no less profitably at the market price than timber cut wastefully from private lands, we see that this whole question of forestry is largely a matter of education and of nothing else. It is clear that it pays, and the chief difficulty is that most lumbermen have not yet learned how well it pays.

How the Fires Start.

"Now," says our ranger, "if you have seen enough of this timber sale, we will leave it and follow the trail along the ridge. The woods are very dry, and I like to ride that trail every day, because there are good lookout points on it for forest fires."

As the horses plod up the steady grade, the bridle reins hanging loose, the ranger talks about the fires which seem to be the worst enemy of the Forest Service.

"You see," he says, "a fire in a forest is a good deal like a fire in a building. If you reach it just as it starts, or soon after, it is an easy matter to put it out; but if it gets a few

hours' start, especially when the wind is blowing, many men cannot do what one man could have done in the beginning. The bigger a forest fire gets, the hotter it is and the faster it travels. The fires you may have seen back East burning through the light ground-cover of the wood lots and the patches of second growth, looked bad enough; but they are no more like the fires which burn through these great forests, the timber pitchy and the ground covered with branches and fallen trees dry as a bone in the summer season, than the trickle of a little brook is like the rush of a great river in flood.

"How do these fires start? Railroad locomotives start many of them from sparks thrown out of the smokestacks. That's a good reason why more engines ought to burn oil instead of coal, because oil engines throw out no sparks. Then there are the people who are continually traveling through the forest, stockmen, and 'prospectors' looking for minerals, and hunters, and campers from the cities who are out for a good time — all these people have to make fires to cook by and to keep them warm at night, and some of them are careless in spite of all we are doing to teach them to be careful. Lightning starts many fires. We have electric storms in these mountains, which bring little or no rain, but much thunder and lightning. If the lightning strikes a tree, and especially a dry, dead one, it often means a fire.

"Then," and the ranger's lips tighten, "there are the fires which start because some man lights them on purpose. Sometimes such men have a grudge against the forest officers for refusing them something they ought not to have. Sometimes they have a general grudge against the Government for taking care of these forests in the interest of the whole people, and not letting men steal the timber and rob the range by overgrazing, as some of them used to do, and would still like to do. Now and then such a man sets fire to the



He looks long at something we do not see

woods, thinking in that way he will get even. He is the kind of man who shoots a President, or blows up a building, or strikes down men from behind; and he ought to be punished as they are punished. But it is hard to catch such men and hard to prove anything on them afterwards."

Now we are on the ridge trail, and we get off our horses and stop awhile. Before us lie like a map wave after wave of mountains as far as we can see. The ranger tells us their names, and points out the natural boundaries of his own great district. One hundred thousand acres sounds like a great deal for one man to take care of, but when we see it spread out before us, it seems bigger still. Twenty miles long and nearly half as wide, with mountains eight thousand feet high within it — a wilderness except for some rough trails and telephone lines, and a few settlers' cabins, and bands of cattle and sheep — this district is a heavy charge upon the quiet, resolute man who points it out to us.

How well he seems to know it all! He talks about the mountains and the valleys as the city man talks of the tall buildings and the streets. Every peak and every gap, every shadowed streak of green which marks a valley, has a meaning to him, and often a name. This man evidently has a map of his district in his mind as well as in his saddle pockets.

As the ranger points out a notch between the mountains, so far away that we can scarcely see its outline against the haze; and as he tells us that through this notch used to pass one of the main travel routes to the Pacific Coast before the days of the railroads, his manner changes and his gaze grows keener. He takes his field glasses from their worn leather case, steps on a big boulder, and looks long at something we do not see. Then he unfolds his map, lays it down on the rock, and follows its lines intently, looking from it to the distant notch.

Soon he is sure; then he turns to us.



Then he unfolds his map, and follows its lines intently

"Fire just this side of Saddle Mountain — not much smoke but there soon will be, with this wind blowing. I'll go on to my cabin and get my tools and some grub to eat as I travel. You had better go on with me, and make yourselves comfortable."

We swing into the deep saddles. It is rapid traveling



"Fire just this side of Saddle Mountain"

now, and half an hour brings us to the ranger's cabin, a trim log house with a good pasture near it. But we are watching the ranger, who moves without flurry, but so surely and quickly that it is clear he has done this often before. Fifteen minutes sees him in the saddle again, a sack of grain thrown across it, axe and mattock tied to it, his canteen full of water, and his canvas pouch holding the food which must last him for several days.

We admire the ranger's wife almost as much as we do the ranger; for without her help he could not have made so quick a start; and without her cheerful good-bye he could

not have left with a heart so light upon a mission which has danger and much hard work in it.

Shall we go with him? Not really with him, because strong as our hearts might be, we do not know how to play the game which he must play; and so we would be more hindrance than help to him. But we might pretend that we go, so as to see how he plays the game, all by himself.



Half an hour brings us to the ranger's cabin

It is two o'clock. The fire is twenty miles away — twenty miles of dense forest, rock ridges, canyon, and mountain side, which is easily the equal of fifty miles over even a mountain road. For fifteen miles the ranger has a trail, but for the last five he must pick his way through the forest, as the settlers had to do three hundred years ago.

He covers the twenty miles in sixteen hours. Four are spent in rest for him and his horse, which is footsore and jaded from the struggle over ledges, fallen trees, and the roof-like mountain slopes of the last five trailless miles.

Fighting the Fire.

The fire is not hard to find. When the ranger is within several miles of its front he smells the smoke, which soon begins to thicken, and deer and smaller animals begin to pass by him, noticing him as little in their terror as if he were one of themselves. He pickets his horse in a mountain meadow, and makes his way on foot toward the fire. To him it is a familiar enemy, whose methods of attack he well understands. He wastes no time, as we might do, in mere wonder at a sight which would hold our eyes spellbound until the acrid smoke made us turn away — the swirling, savage onrush of forest fire through resinous, green timber in the dry season, a high wind behind it, and a sea of forest in front.

Yesterday it was a little creeping, crawling blaze only a few yards square, working out from a camp fire which seemed to be dead, but which still held a few glowing embers; so the man who made it went on his way unthinkingly, leaving the source of sure destruction behind him. Then, a little thin line of fire, eating through the dry "duff" of the forest floor, bursting into tiny flames as it found twigs and branches to feed on — a fire which a boy could have stamped out with his feet or smothered with the blows of a green bough. To-day, an avalanche of smoke and fire, roaring like a thousand trains, traveling faster than a man; now wrapping whole trees in flame, now under a puff of wind flashing across acres of tree tops; sometimes a ground fire, sometimes a crown fire, sometimes a wall of flame a hundred feet high, in front of it a furnace-like wind laden with smoke and sparks, and carrying burning branches like feathers; behind it the stench of fumes, the pall of smoke settling over a forest blasted where it stands, except for the few green patches where through some trick of wind or draught, the fire missed its prey.

What can one man do in the face of such a fire? That little the ranger does unflinchingly. He starts a backfire half a mile ahead, at the foot of a steep slope. By raking away leaves and litter he makes a rough firebreak, along a



A forest blasted where it stands

narrow ridge. But he might as well expect to do the work of fifty, as to get such a fire as this under control unaided; and as the day lengthens, the ranger, his eyes and face smarting from the heat and smoke, his clothes torn and grimy, his mouth parched for water he has no time to get, his whole body rebelling against the tremendous toil of fighting fire unaided, begins to look anxiously for the help for which he telephoned before he left his cabin. Not un-

til the morning of the second day does help come, and then it is but a handful of men in charge of a ranger from a neighboring district. Even to get the fire fighters together, mounted, equipped, and on the ground so soon in this remote and thinly settled country was in itself a notable achievement.

To get an outline from our ranger of the size and direction of the fire and of the lay of the land, is the work of a few minutes. Then while the ranger gets the rest they insist that he shall take, this little body of men, jaded by many hours in the saddle, tackle the harder work ahead without thought of rest for themselves.

To understand what they endure and what they accomplish in the next four days is impossible unless we were actually with them. They are constantly on the fire line. To do a man's work there calls for no less courage and efficiency than men must have who acquit themselves well on the firing line in battle. There are no newspaper correspondents nearby to send stories to the papers about the brave things they do; the spur of rapid promotion for gallantry in action is lacking; the support which comes by fighting shoulder to shoulder, or even in open order on the skirmish line is not theirs, because while they work under one plan and together, they can seldom see each other for the swirl of smoke. Those four days mean constant fighting against an enemy which is cruel and powerful and overwhelming as no human enemies are. It means scorched hands and faces, lungs and throats burned from the rasp of the wood fumes, and the physical and mental torture of exhaustion. It means danger always, and sometimes the near peril of death.

There are times during those four days when, as the fire is almost under control, a sudden gust of wind, followed by the breaking out of fire afresh all along the line, suddenly

changes the problem into one of saving lives instead of saving the forest; and again and again this little body of hardy and resourceful men meet and overcome the crisis and turn back from saving themselves to saving the trees.

Four days sees the fire under control. It also sees ten thousand acres of timber destroyed, and one fire fighter's shoulder broken by a falling limb. The bald report which goes into the Supervisor's office over the telephone is that the fire on Saddle Mountain is under control, with an outline of the damage done; and our ranger and his companions go back to their other duties, with the certainty that many times before the summer is past they must again face a trial of strength with forest fire.

Brave Ranger Pulaski.

These rangers are taking care of our property. We ought to learn all we can about them. The summer of 1910, by reason of great drought and unusually high winds, was the worst for forest fires that the West has ever known. In Montana, Idaho, and Oregon the danger was greatest.

On the Coeur d' Alene National Forest in northern Idaho, Ranger Pulaski had under him forty men, who after many hours of hard work had gotten a big fire practically under control. Suddenly the wind strengthened until it blew a gale. It immediately became a question of saving the lives of the men. The fire fighters were in deep forest, many miles from a railroad, and far from any clearing.

Pulaski remembered that within a mile of where they were working there was an abandoned mine shaft, running back about forty feet into the hillside. He rushed his men to the shaft as quickly as possible, and told them as they passed through their camp to catch up their blankets as they ran. The shaft reached, Pulaski hurried his men into it, and,

packed like sardines, they filled it full. Pulaski placed himself at the opening, across which he stretched a blanket.

Within a few minutes after the men were in the shaft, the fire came. The blanket at the opening caught and Pulaski jerked it away and hung up another, which caught in its turn. The blanket caught again and again and each time Pulaski replaced it, until towards the last he held the blanket across the opening with his bare hands. The shaft grew hotter and hotter, and the smoke and fumes grew thicker and thicker, until the men's sufferings were almost beyond human endurance. They began to break for the opening. Pulaski, whose strength was great like his courage, for a while forced them back. Seeing that he would soon be overpowered, and that his men would rush to their certain death, he drew his revolver, and said that he would kill the first man who broke away.

In perhaps twenty minutes the worst of the fire passed by. Five of the men in the shaft were dead from suffocation; the other thirty-five were alive. Pulaski was blinded and seriously burned upon the face and arms. It was three months before his sight was partially restored. Had not his heroism and presence of mind been what they were, he would have lost all of his men instead of five. That is the kind of men there are in the Forest Service.

Another Forest officer, Deputy Supervisor Thenon of the Clearwater National Forest, was caught with sixty men in much the same way. He took them on the run into a great cedar swamp upon the banks of Moose Creek, a tributary of the Clearwater. Not in the memory of the oldest settler or Indian had this swamp ever caught fire. But on this day of as great drought as the Northwest has ever known, with a hurricane blowing, it caught and burned like tinder. Thenon soon saw that his men could not live in the swamp, and he ordered them to take their blankets and to get into the river.

Under his instructions each man soaked his blanket and got under it, so that it formed a cone around his head. He then stayed under water as long as possible, coming up for a few seconds to breathe under the blanket, and then submerging himself again. The fire swept right over their heads. Afterwards, Thenon said that it sounded like the roar of a thousand trains crossing a thousand trestles. He saved every man, and his horse as well, which he had taken with him into the river.

Ranger Kaufman got caught with a crew of twenty-five men on the Cabinet National Forest, and they had to run for it. The situation was desperate. The ranger led his men out on a rock slide on the side of a mountain, and ordered them to pile up a barricade of stones as rapidly as possible parallel with the line of fire, and then to lie down behind it. This they did, and every man behind the rock barrier was saved. Two men, who under stress of fear and confusion broke away, were found dead a few hundred yards from where their companions had lain in safety.

There are many such true stories of the fight the men of the Forest Service made against the great fires in the summer of 1910. Of these brave men, eighty gave up their lives. Those lives were lost no less honorably than if they had been spent in fighting against human enemies rather than against the enemy of all men. As a result of the devoted service rendered by these men and their companions, forest fires which might have been a still more terrible national calamity were finally put out. Had the Forest Service been given more men in the beginning to patrol against fire, the fires would have been subdued before there was any material loss at all.

What the Forest Service has done with its pitifully insufficient force to protect the great National Forests from fire is one of the things of which all Americans should be

proud. When we remember that the standing timber and the other resources in the National Forests are worth more than two thousand million dollars, we understand part of what the Forest Service is doing for the nation.

Fire not the Only Enemy.

There is another picture which has no self-sacrifice in it. We ought to look at that too, because it is no less important than the other. While these rangers have been riding the lonely trails, fighting fire unflinchingly, meeting efficiently and cheerfully the myriad calls upon them by the people, some other men have done all in their power to destroy the great system for preserving the people's forests. Men, frock-coated and wide of girth, have balanced ponderously before their mahogany desks, and made the Senate Chamber ring with torrents of abuse of these same rangers, and of the policy of thrift for which they stand and strive. Were it not for the attacks of such men upon the Forest Service, it would have had more nearly the money needed for its work, and many of the lives which were lost and most of the timber which was burned would have been saved.

The Forest Service has had to meet the attacks of those members of Congress who are in effect representatives and servants of the great interests, just as men on the other side are the representatives and servants of the people. The National Forests are a rich prize. The timber, the grass, and the water powers would make a few men rich instead of helping all, if the few men had their way; so through their agents in Congress these few men still struggle for the rich prize they will never gain. The American people, that great silent power whose weapon is public sentiment, and which some men can lead but none can drive,

believe in the National Forests. And what they believe in they will defend.

The Forester.

But public sentiment awakens slowly; and there have been times, now happily gone forever, when the very existence of the National Forests was threatened. That they stood through these years is chiefly because in one man, and he the Forester, was combined the high qualities of leadership and statesmanship. This man is Gifford Pinchot, under whose patriotic and wise direction the Government forest work grew from nearly nothing to the great national power for the public welfare which it is to-day. His work will live longer than even the tall trees will live. He has aided as few other men have ever done to make America a pleasant and a fruitful land in which to dwell. Not only the green forests are a perpetual token of his usefulness, but the whirring sawmills and the busy wood-working factories, the even flow of forest-fed streams, the timber which is the raw product out of which comes work and homes and happiness for millions, are the things he aims for and has won, and which will do him still greater honor. For no great forester cherishes the forest for its own sake, much as he may love its beauty and its charm, but only for its usefulness to man. This is true of Gifford Pinchot, as it is true of Henry S. Graves, another great forester who is now at the head of the Forest Service.

Private Forests.

Any man who takes good care of his own private forest makes it really a National Forest, because he makes it permanently useful to the nation as well as to himself.

Three fourths of all the forests in the United States are

in private hands; but only about one per cent of these private forests are being properly used, and protected from fire.

To protect all privately owned forests in the United States from fire would cost about one fifth of the value of the timber burned each year.

It seems strange that American lumbermen, who like most other American citizens are patriotic, alert, and intelligent, should go on wasting what they have with great loss to themselves and to us all. Why is it?

It certainly is not because they have not been told, for the Forest Service has given its time and effort to telling them, no less vigorously than to managing and protecting the great National Forests. It has made of itself a huge "Bureau of Information" for lumbermen who wish to find out how best to handle their own forest holdings.

The real reason why more lumbermen do not practise forestry is partly because only a few states are taxing the forests fairly. The taxes are often so high, particularly on cutover land, that they discourage many lumbermen from holding and protecting their cutover lands until they can grow a second crop of timber. The real reason is also partly because timber does not yet bring generally what it will cost to produce it again.

It costs a good deal of money to grow a thousand board feet. We must charge against the timber crop a fair interest upon the capital invested in the land on which it grows, until the timber is ripe for the axe; there are the taxes every year; there is the cost, also every year, of hiring men to patrol the forest on the lookout for fire; and there is the cost of leaving seed trees after logging, and of piling and burning the brush. All these items taken together make a cost of between five and ten dollars for growing a thousand board feet, depending upon the kind of trees, how fast

they grow, and the value of the land. This is more than twice as much as "stumpage" usually sells for in the United States; by "stumpage" is meant the timber contained in standing trees, which is estimated and sold at so much for each estimated thousand feet of lumber in the trees. When taxes on forest land are lower and stumpage brings more, all lumbermen must practise forestry, either of their own free will or by the will of the people.

It is a good thing to think about these problems when we go into the woods, or when we talk with lumbermen. They are all real problems, and upon their being worked out wisely depends the question whether by the time we are old there will be enough timber grown in the United States for all the purposes for which timber is needed.

Teaching the People.

Forests not only grow wood, of which our need is only second to our need for food, but they also regulate the flow of streams; they are the home of most game birds and animals; they temper the climate; and their product furnishes one of the chief sources of employment for men and women. They are necessary to our civilization, to our prosperity, and to the very existence of this great nation.

The Forest Service is teaching the people how to care for their forests, as well as showing them how, by its management of the National Forests. People ask the Service many kinds of questions, and it sets its trained foresters to getting the answers. These are some of the questions:

"I have a wood lot," says the farmer. "It is in poor shape because I have taken no care of it. What can I do to make it yield more? Wood used to be plentiful and cheap around here, and I thought it would be so always. But now I need every stick I can raise."

More than a million farmers need to have that question answered. All the wood lots in the United States together would make an area larger than Germany. Most of it is yielding very little, and some of it does not yield enough to pay taxes. All of it can be made by handling it carefully to yield firewood or fence posts abundantly, as well as wood for other uses on the farm.

"We have a hundred thousand acres of timber land," says the lumber company. "Come and study it and tell us how you think it should be managed. In the old days we would have skinned it and moved on; but times are not what they used to be. Timber land is scarce and it comes high; and we have got so much money tied up in our saw-mill and the rest of our plant that we must have timber to work on straight along."

The men who need that question answered own most of the standing timber in the United States.

Another farmer may say, as many of them do:

"I pay a good deal more for fence posts than I used to pay, but they don't last any longer in the ground. Can you tell me how to pickle them in some preservative so that they will last longer? I have heard that it is worth trying, and I want to know all about it; just how to do it, and how much it costs, and what results I may expect."

Or another company may say:

"We are not in the lumber business. We are in the railroad business. We buy timber to use; we don't produce it. It takes several million ties each year to build new tracks and to keep our present lines in repair. These ties cost a lot to buy and put in the track, and they rot out in a few years. If we could make them last two or three times as long it would save us something. How shall we set about it?"

There are about seven hundred million wooden ties in railroad tracks in the United States. If they had all been

pickled in creosote or some other good preservative before being laid, it would mean a saving to the railroads, through the increased life of these ties in use, of about sixteen million dollars a year. It would mean a still larger saving to the country through making our forests last longer.

Two Great Tasks.

So you see that the Forest Service has two great tasks: to manage the National Forests so as to make them permanently useful to the whole people, and to teach Americans how to make the forests they own last longer and produce more, through better methods of logging and fire protection, and more conservative use of the timber itself.

That the Forest Service is doing both these things well is something over which we may all be glad, because we are Americans. The Forest Service is working for the good of all Americans by helping greatly to make America a happy and a prosperous country in which to live.

CHAPTER V

THE FARMERS' FARMS AND THE NATION'S FARM

NOW we have been in some of the great American forests, and have seen the timber being harvested; and soon we are going into one of the big mines from which come the coal. We certainly should see something also of the wild game before we stop; and it will be an interesting trip to follow a river from its source to its mouth, and to see what use men are making of it.

But before we take up these things we should see a little of the farms from which comes the food we eat, as well as the food which America sells to feed hungry people in other parts of the world—the corn and the wheat and the other field crops, and the beef and mutton which are really farm crops too.

We will begin our journey in the South and travel north to New England. Then we will go westward through the rich Mississippi valley to the Public Domain. But before we start there are a few facts we should have well in mind.

Perhaps your father has a home in the country. Or if not, you have visited such homes, and you know how seldom it is that even a small farm is all good land under cultivation.

Even the little farm usually has its patch of woodland, generally on the roughest, poorest soil, from which the farmer cuts some firewood and perhaps a little post and pole timber. The same farm often has its bit of swamp or marsh along the river or the brook, which is too wet to

plough until it has been drained, and in the meantime is practically useless. There may be the steep south slope of a hillside, which will grow little or nothing because it is too dry instead of too wet; and before we get to the productive farm land we are likely to cross a field or two which is lying abandoned because it has been farmed to death.

So much for the little farm. Now how about the United States, that farm of three million square miles, whose wood lots are the Northern Pine Belt, and the Southern Hardwoods, and the other great forest regions? Men have mapped it and studied it; and while they cannot tell you about it as accurately as you can describe the little farm which you know, still they can give you a fairly good idea of what it contains. This is what they say:

Of the whole United States a little more than half can be farmed profitably, and a little less than half is already being farmed. About a quarter is forest. The remainder is rugged mountain, marsh, and swamp which must be drained before it can be farmed, or so dry that crops will not grow on the land until it is watered by irrigation.

This is a big farm. It is feeding nearly a hundred million people in this country, and about twenty million people in other countries. Four fifths of the corn crop and over half the cotton crop of the world is grown in America. Let us go and see what condition this farm is in, and whether we are using it rightly.

Cotton and Corn.

The first part of our trip takes us back to the "piney woods" of the South, where we found the "turpentine orchards" and the steam log loader at work; but on the rich low lands we see, perhaps for the first time, crops of cotton and sugar cane. For now we are not far from the tropics,

and the sun is so hot that white men seldom work in the fields; but such work is usually done by colored men. Some of these plantation hands are bowed and white-haired; they could tell us about the slave days, now gone forever, when the dark-skinned men and women were the chattels of their masters.



Cotton like snow over the ground

Even here, where heat, abundant rain, and a rich black soil should mean steadily better crops year after year, we notice great differences in plantations which occupy the same quality of land. On some the cotton is like snow over the ground, while on others it is but a sprinkle of white; and the difference in the crops is as high as a bale to the acre, which is about four hundred and fifty pounds of raw cotton. What is the reason?

It is the same cause of which we saw the results in the forests, and which we shall see on the public range, and when we come to the mines, the rivers, and the wild game — the lack of thrift.



Spindling, yellow-green corn stalks

In whatever part of the country the farm may be, there are two rules which no good farmer can afford to break. He must plow and harrow thoroughly, because without good cultivation the soil does not give up its plant food freely, and dries out very fast. He must enrich the soil, both by changing the crops so that one crop will put back part of what another has taken away, and by manure and what are

called "commercial fertilizers," such as ground rock containing phosphates and other plant foods.

As we turn northward, the sugar cane disappears and the cotton dwindles and grows poorer, until at last it vanishes. We begin to see wheat and oats and more and more corn.



The farmer counts more than the land

We pass fields of spindling, yellow-green corn stalks bearing not more than one ear to the stalk, and perhaps half of these ears are nubbins; while the very next field may show what a royal crop is corn when the farmer makes the best instead of the worst of his land. In such fields the stalks are ten feet high, with blades three or four feet long;

and we see two and sometimes three ears to the stalk, and each a full ten inches long.

They are different pictures to look at, and they are just as different when it comes to the profits. What does the farmer who owns the first field make? His seed and labor have cost him about ten dollars to the acre, and the acre yield is twenty-five or thirty bushels. If his corn brings fifty cents a bushel, this makes at most fifteen dollars to the acre, or five dollars return on his labor. Now what does the farmer in the second field make? It cost him about fifteen dollars an acre for labor, seed, and fertilizer. His crop is sixty or eighty or even one hundred bushels, which means a net return of from fifteen to thirty-five dollars to the acre, or three to seven times what the other farmer made. The farmer counts more than the land.

For many years the great United States Department of Agriculture has been teaching the farmers, and particularly the Southern farmers, to grow better and more profitable crops. It has accomplished much, and to no one man is more credit due than to the late Dr. S. A. Knapp, who thoroughly understood not only Southern farming but the Southern farmer; and knowing the one counts nearly as much as knowing the other. For farmers do not turn to new methods readily, and they are apt to hold the knowledge of strangers in small esteem. Have you never heard some old farmer say something like this?

"Yes, I reckon the Government is spending a lot of money to teach us old dogs new tricks. But what can those men back in Washington teach me about how to grow corn? I have farmed this place for thirty years; if I don't raise more corn it is the fault of the land, not my fault. These new theories may be all very well for those who have time for them, but the man who knows most about raising corn is the man who has spent most of his life raising it."

The next time a farmer says something like that to you, tell him this story:

Boys the Best Farmers.

Doctor Knapp found out that one of the hardest things he had to overcome in order to get Southern farmers to



Without good roads crops cannot be hauled to market

practise better methods was just this attitude toward what the farmers call "scientific farming." He set quietly to work and started a movement for corn-growing competitions between farmers' boys. The result was that in most cases the boys who followed Doctor Knapp's instructions for the care of their crops beat their fathers at raising corn. One boy, a South Carolina boy named Jerry Moore, raised two hundred and twenty-eight bushels of corn on an acre of

land. Another South Carolina boy raised one hundred and seventy-seven bushels, at a cost of only twenty-three cents a bushel.

Through the work of Doctor Knapp, who has now gone to his rest after a life full of usefulness, and through the



Good roads no less than good crops are needed to make prosperity

work generally of the Department of Agriculture, the farmers in the South and the farmers elsewhere are gradually coming to learn that farming after all is a science; and that to get the most out of the land and still to improve it is a task which calls for close study and careful records of results, for investigations of seed and soil, and for all the other apparently useless things that "those fellows back in Washington" are doing. Farm journals like "Wallace's

Farmer," and the work of the State Agricultural Experiment Stations, are giving great support to the campaign of education in farming carried on by the Government, and their combined efforts are beginning to bear fruit.



Even the boys and girls suffer from bad roads

North and West.

So we travel further northward, through the Carolinas, in which a new era of development is dawning; for the recent growth of the South in agriculture and in manufacture has astonished the world. But signs are still frequent of that lack of thrift whose handmarks are fields worked to death and abandoned, crops stunted and starving for lack of proper cultivation and nourishment, and roads gullied and

deep in mud. For good roads no less than good crops are necessary to the prosperity of the farmer. Without them crops cannot be hauled to the railroad or to market, farm values do not greatly increase, and even the children suffer, for they cannot walk dry-shod and easily to school.



Where children walk dry-shod and easily to school

Now we turn westward, and are soon in the great Mississippi valley, where most of our corn crop is grown. As we look through the car windows we see farm following farm, mile after mile and hour after hour. The warm wind rustles the great forest of corn on either side, with the loose black soil beneath it; and now and then the corn gives way to small grain and fragrant fields of timothy and clover. For now we are in one of the richest farming regions of the



Ranches where the use of fertilizers is as yet unknown

world. The crops tell us so; as do the comfortable farm houses, the huge barns, and the trolley lines which often parallel the railroad track.

But if we were to stop and ask the owner of one of those rich farms whether his crop yield per acre and that of his neighbors was increasing, he would answer us something like this:



How some pioneer farmers in the Southwest bring in the hay

"Well, that is a hard question. Some of us grow less per acre, and a few of us more than we used to do. I reckon it averages about the same as it did thirty years ago. Before then the farmers grew bigger crops for they worked the rich soil which had never known the plough before. They took the cream and left us the skim milk; and it is skim milk still for those who cling to the old methods, which do not put back any of the cream."

If we travel on to Kansas, the Dakotas, or to distant California and Oregon, we will see what has well been called

“bonanza” farming; ranches sown in wheat to the horizon, whose size is measured by the thousands of acres instead of the hundreds we know in the East; ranches on which the plowing and harvesting are done largely by steam



Where farming is a struggle for existence

power, and where the use of fertilizers is as yet unknown; ranches whose owners mine the virgin prairie soil, regardless of the future.

Although our trip shows us many conditions, from the semi-tropic cotton fields of the Gulf States to the orchards of New England and the seas of wheat in the Northwest,

all our farms, as Henry Wallace so well puts it, fall into these three classes: the pioneer farm, with its few rough tilled acres, whose owner farms to exist and seldom even thinks of improving the soil; and the "bonanza" farm, where neither capital nor initiative is lacking, and where



The handiwork of the man who is a good citizen and a good farmer

crop production goes forward on a huge scale without regard for the soil or for those who must wring a livelihood from it later. But here and there — and that is the hopeful side of it — we see the handiwork of the man who is a good citizen because he is a good farmer; the man who holds his land in trust for the people, like the lumberman who practises forestry; who learns from the mistakes of other men and takes advantage of the stored knowledge at the disposal of all, to steadily increase the product of his farm.

He is the farmer of the future; upon him depends in a very real sense the welfare and the very existence of this nation, which already has nearly one hundred million mouths to feed, but whose land area must always remain the same.

We must Grow what Food We Need.

We have already agreed that figures are sometimes tiresome things. But the figures which deal with crop production teach this great lesson:

The farms of America feed all Americans and employ one third of them.

By the year 1950, or within less than fifty years, America probably will have two hundred million people living within it. By the year 2000, or within less than ninety years, America will have not less than three hundred million mouths to feed.

To produce food for three hundred million people at our present crop production per acre would take two thirds of the total area of the United States. That means that we would have to farm the deserts and the mountain tops, as well as the fertile lands. This we cannot do. The only thing left to do is to grow more food per acre.

How much more food can we grow? That is something which no one knows exactly, because the range of crop production per acre is steadily increasing through the discovery of better farming methods; but we do know that while we produce an average of about fourteen bushels of wheat per acre, Germany produces twice as much, and England still more. We produce thirty bushels of oats to the acre; Germany produces nearly fifty and England about forty-five; and we are farming fresh soil, while the lands on which Germany and England grow crops so much greater than our own have been farmed for many centuries.

It is clear that if this nation is to go on growing great it must improve its farms just as it must improve its forests. So soon as we begin to depend upon other countries for an important part of our food supply, just so soon will our greatness vanish. Again it is a question of living within our means.



Remember Germany, with its beautiful villages

Think of England with her population nearly one half our own, and of her feverish efforts to bring food from other countries to feed those empty mouths. Her iron freighters furrow the high seas, loaded to the limit of safety with the wheat which means the bread which men must have to live. But the cry is always for more; and this growing hunger for food which England must buy elsewhere or starve, puts her in a real sense at the mercy of the other nations.

A man or a boy who owns or works a farm and who makes no effort to maintain and improve its yield can never

be a useful citizen, a wise father, nor a helpful son. Remember Germany, with its smiling valleys carpeted with rich crops, and beautiful villages filled with thrifty people, well content to make a fair living from the soil and to keep it in good tilth. They tried mining the soil there just as we are trying it, and they found that it might enrich one man



The soil was meant for many men to live on and improve

or one generation, but that it brought suffering to the next.

Germany came to see, as we are coming to see, that the soil was meant for many men to live on and improve, and to rear healthy families upon; but that the farm was not meant, any more than the forest was meant, to make a few men rich at the cost of making the nation poor.

The Public Domain.

That part of the United States which is still owned by the Government is nearly all in the West, and is called the Public Domain. This is land which came into the possession

of the nation in the beginning and has not yet passed into private hands, by being taken up for farms, or mines, or for the timber.

Part of this public domain, like the National Forests and the Military Reservations, has been set aside for definite purposes by the Government; but there are still three hundred million acres, or about one sixth of this country, which is called the "vacant" or "unappropriated" Public Domain. Nearly all of it is in what are called the arid and semi-arid states, which means practically every state in the far West. The great bulk of it is in Idaho, Wyoming, Montana, Nevada, Utah, Colorado, Oregon, Arizona, and New Mexico.

Much more of this land would long ago have been settled upon and farmed were it not so dry that it will raise crops only under irrigation.

Part of the public domain, particularly in Nevada, Arizona, and New Mexico, is desert — great arid stretches of soil as dry as powder, which will grow only scattered clumps of sagebrush and other dry land plants, and where the blazing sun pours down from a cloudless sky, and little or no rain falls. But as the ground rises and the forest-clad mountains grow nearer, the rainfall increases, so that within this great domain are found many degrees of dryness, from the furnace-like heat and absolute drought of Death Valley, two hundred and fifty feet below sea level, to the rolling country of Eastern Oregon, in which wheat is raised with fair success by taking advantage of the snowfall as well as of the scanty rainfall.

In spite of its general unfitness for the plow, most of the public domain grows grass and other natural forage crops abundantly, so that its chief use has come to be as a range for sheep, cattle, and horses.

Suppose we took a train at Chicago, or St. Louis, or Kansas City, or New Orleans, and traveled westward. If we

followed a northern route, we should see different scenes and crops from what we should see by a southern one, although the great classes of country through which we passed would be about the same. So let us take a middle route, which will show us characteristic conditions, unchanged by either great heat or cold.



Like green garlands on a dull carpet

We pass westward through the fertile farming states on both sides of the Mississippi valley; and as we enter the western part of Nebraska, or of Kansas, the farms grow larger and less fruitful. There are fewer houses, and we notice that the water tanks are farther and farther apart. The trees become fewer and fewer, until they grow only along the water courses; and often we can see straight to the sky-line all around us, with not even a bush to break the view.

The air is no longer laden with the scent of growing



A loneliness which cannot be told in words

things, and we begin to taste the keen dry air of the open range, the best tonic man has ever found. The train seems to be growing smaller, and from the window we see the strange pictures this vast expanse of treeless, manless, seemingly homeless country has to show as we enter through



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More and more cattle

its oceans of solitude. Jack-rabbits, frightened by the train, race with ungainly but astonishing speed from the shelter of one clump of sagebrush to another; and if our eyes are keen we may catch a glimpse, especially toward dusk or early in the morning, of a loping coyote vanishing up some draw or canyon.

The mornings are cool and crisp, but in the middle of the day the heat climbs until the thermometer in the train regis-

ters around one hundred degrees. It is like no heat we have ever felt before; it seems to have a tonic quality of its own, and when the chance comes at the little stations, we stretch ourselves and enjoy exercise in a temperature which at home would send us seeking the shade. These stations are like oases in the desert, with their bright flowers and their patch



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The cattle graze in open order

of emerald green grass in front. Occasionally we see a string of homes and ranches up the valleys, like green garlands laid on a dull carpet. What a relief it is to turn from the reds and browns and grays of the open range to the rich colors of these irrigated farms! Gridironing them, like white lines on a football field, or leading from the main ditch like twigs from a branch, we see the shallow sluices through which trickles the magic water whose touch makes this desert blossom with homes.

Between the valleys, which are many miles apart, we see nothing but the billowing open range, sometimes flat as the

sea, sometimes choppy like rough water; sometimes rising and falling in great waves of land to the distant mountains; but always impressive as nothing else is impressive except the sea, and of a loneliness which cannot be told in words.



A shepherd's burros. One is eating a newspaper!

We see more and more cattle and sheep. The sheep are generally in the higher country, the cattle lower down. We have never seen such great flocks of sheep or herds of cattle before. Bands of two thousand sheep are common. The number of the sheep is always easier to estimate for they are close together, sometimes so close that they look like a huge dirty white blanket stretched over the range. The cattle graze in open order, scattered in twos and threes; and

while a band of a thousand sheep may not cover more than a few acres, a herd of cattle of the same number usually spreads over several square miles.

The Shepherders and the Cowboys.

We would greatly like to stop and talk to those lonely shepherders, one of whom we always see near his band of



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Their lithe figures a straight line from heel to head

sheep. Most of them are swarthy men, like Spaniards; as a matter of fact, many of them are Spaniards by origin, men whose forefathers came over from the sheep country in the mountains of Spain or Portugal, and who are following here, far from their own land, the trade which is theirs by inheritance. Each has his dog and a horse, or more often a "burro," as they call a donkey in the West, to carry his scanty outfit. Such men are often alone with the sheep for weeks at a time. What stories they could tell if they had the gift of speech, of the wonders of the wide places, of the glories of sunrise and sunset and storm on the open range, and of the wild animals from which they protect their charges.

The cowboys would be worth talking to as well, and probably easier to talk to than the lonely shepherders, for they often wave a friendly signal at the train as it passes, which the shepherders seldom do. Lean, tanned, effective-



Photo from Harriet Chalmers Adams

There is much that is stirring about the life of mounted men.
A cowboy of Argentina

looking citizens they are, with their lithe figures in the deep saddles, a straight line from heel to head. The cowboys could tell us interesting stories too — stories of stampedes, as hard to stop as they are easy to start; stories of all-day fights between great range bulls; stories of roping, brand-

ing, and bronco "busting," and of the other strenuous duties of their rough riding lives.

They could tell us how in the old days the life of the cowboy was so full of incident and of adventure that no man who wrote about it needed to tell more than the plain truth



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A bucking mustang

to interest his hearers; of the days when mounted men formed for weeks and even for months a living fence around the great herds of half-wild cattle, herding them, quieting them, singing to them when a stampede threatened, or risking life in a wild ride to check them when they broke; driving them from one range to another, caring for them no less faithfully than the shepherd for his sheep; and bringing them back ready for the stock train and the slaughter house in the fall.

They could tell us how the life of the range gradually changed as settlement thickened, how the competition for the forage increased, and how the wire fences, which now enclose vast areas and are continually enclosing more, have greatly changed the life of the cowboy.



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In the sun-baked corral

But in spite of the wire fences, there is still much that is stirring and fine about the life of these men, as there is about the life of any other mounted men or men afoot, whose work carries them into the open and away from the beaten tracks. There is bronco "busting" in the corrals, the western name for a little oval space about one hundred feet across, enclosed in a high board or pole fence, where men struggle to conquer bucking, biting, screaming mustangs,

some of them five years old before they feel the touch of man, and which fight like demons by every trick known to savage horseflesh, in the billowing dust of the sun-baked corral.

They could tell us stories of the daily round of the cow-



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Roping and throwing a calf for branding

boy's life; cutting out and branding the calves, and roping picked cattle from a herd; and stories of the cattle, to whom a man on foot is so unfamiliar a sight that they are likely to close in around him from sheer curiosity.

The story is told that when the great Spaniard Cortez conquered the Aztecs, which were and are still the Indians of Mexico, — although Cortez's conquest of Mexico was several hundred years ago, — he was greatly aided by the

superstitious awe with which the Indians regarded horsemen. They had never seen horses, some of which Cortez had brought with him and his men in their ships. The Indians believed that the man and the horse was all one strange animal, which they greatly feared. Cortez and his



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Branding a calf

followers corrected this mistake as little as possible, and it is said they even slept and ate upon horseback for days at a time. The wild range cattle are a good deal like the Aztecs; they have much respect for a mounted man, but none for a man on foot.

Stock Followed Buffalo.

The most important thing we might learn from the cowboys would be the story of the use and abuse by the stock-

men of this great Public Domain, which on an enormous scale is practically the same thing as the common outside the village, on which the villagers together pasture their milk cows. The only difference is that the Public Domain is as



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Roping picked cattle from a herd

big as Germany and France together, and is owned by the nation instead of the village.

Much less than a hundred years ago these great plains and many of the grass-covered mountains knew only the buffalo, which roamed in herds so vast that they literally

covered the ground for miles. The dainty, beautifully-marked antelope, one of the fleetest four-legged creatures in the world, were plentiful, while nearer the forest there were abundant elk and black-tail deer.

As the tide of settlement swept westward, the big game was slaughtered; the buffalo were wiped out, and the antelope became so rare that strenuous efforts are now needed to keep it in existence.

Where there was water for irrigation, homes and farms sprang up; but it did not take men long to find that the chief value of these great stretches of semi-arid lands was as a natural range for sheep and cattle. They soon began to raise more stock than they needed for their own use and to sell it to other parts of the United States, and even abroad. This went on, until now America is the greatest producer of beef and mutton in the world. The famous roast beef of England is nearly all American beef. The city of New York alone uses over two thousand beef cattle a day. And the call is always for more, for Americans are a meat-eating race, and we live in a meat-eating age.

The stock industry grew until the sheep and cattle on the western range far outnumbered the buffalo which preceded them. The numbers are now so great that they almost surpass belief. At present forty million sheep and thirty million cattle graze on the open range each year.

The Range is Being Wasted.

As the cowboy told us back in the National Forest: "What nobody is responsible for nobody will take care of." Men grew rich quickly from the stock business, but left the ranges to look out for themselves. About twenty years ago the pinch came. The stockmen began to see that the ranges were getting to be overcrowded, and that as a result the grass

crop was steadily poorer year by year. Had they owned the range themselves, or had the Government done its duty by regulating its use, the herds would have been reduced until the range carried only as much stock as it could feed without overgrazing. What that is can be estimated very closely; it varies, depending upon the quality of the range, between thirty and sixty acres to each head of cattle, and from one and a half to six acres to each sheep.

But a man's first impulse when there is not enough of anything to go round is, sometimes, not to take less himself, but to prevent another from taking any. Men seldom owned both sheep and cattle, but generally one or the other. Where sheep have grazed cattle do not do well, because sheep eat the forage so close that there is little left for the cattle after sheep have passed over the land. Sheep travel greater distances and graze over wider stretches than cattle, and they can winter on a range where cattle would starve. The result is that the cattlemen, rather than the sheepmen, have been the home builders, since with the cattle business there must be a home and a farm in order to produce feed for the winter; while the sheep winter on the lower ranges, on which they can live even if they have to nibble the dead grass out from under the snow. So while both industries are legitimate industries, the cattle business is the one which by its very nature has done most to build up the range country and to bring homes within it.

The competition between the sheepmen and the cattlemen, and sometimes even between representatives of the same industry, for the possession of the range grew more and more bitter, and soon there came range wars and bloodshed. Stockmen competing for the same range would sometimes tell each other that they would consider such and such a river or mountain crest as a dead line, which the other man's stock must not cross. This dead line was often held

with Winchesters, and human lives were sacrificed and sheep and cattle were slaughtered wickedly and uselessly.

The range wars are a dark page in American history, and the page will not be finally turned until the Government handles grazing on the Public Domain as it is handled within the National Forests.



Heavy with fruit

Men like James R. Garfield and Gifford Pinchot, who have the public interest first at heart, aided by far-sighted stockmen like Murdo McKenzie and Dwight B. Heard, have worked out a practical plan which requires only action by Congress to bring about the use of the whole public range in the interest of the stockmen, as well as of the American people. Under this plan the great ranges will be divided into districts; the districts in which sheep will do best and those which are suited for cattle will be designated, and trained men will determine how much stock should graze

in each, so that the Public Domain, like the ranges in the National Forests, will steadily improve.

Probably not long after this book is written some such regulation will be put into effect, because the present condition is not only wasteful, but intolerable to most of the Western stockmen.



We see the sluices from which the land is flooded

The Work of the Reclamation Service.

Now we cross a green valley which lies between dust-colored desert hills. We notice that the valley is dotted with homes which must be prosperous, for the barns are bigger than the houses themselves, and up and down this beautiful green ribbon of a valley are rich fields of alfalfa and small grain, and orchards heavy with fruit. We have never seen such farms before — they are no more like most of the farms in the East than the tall, rich forests of the



We come to a great reservoir

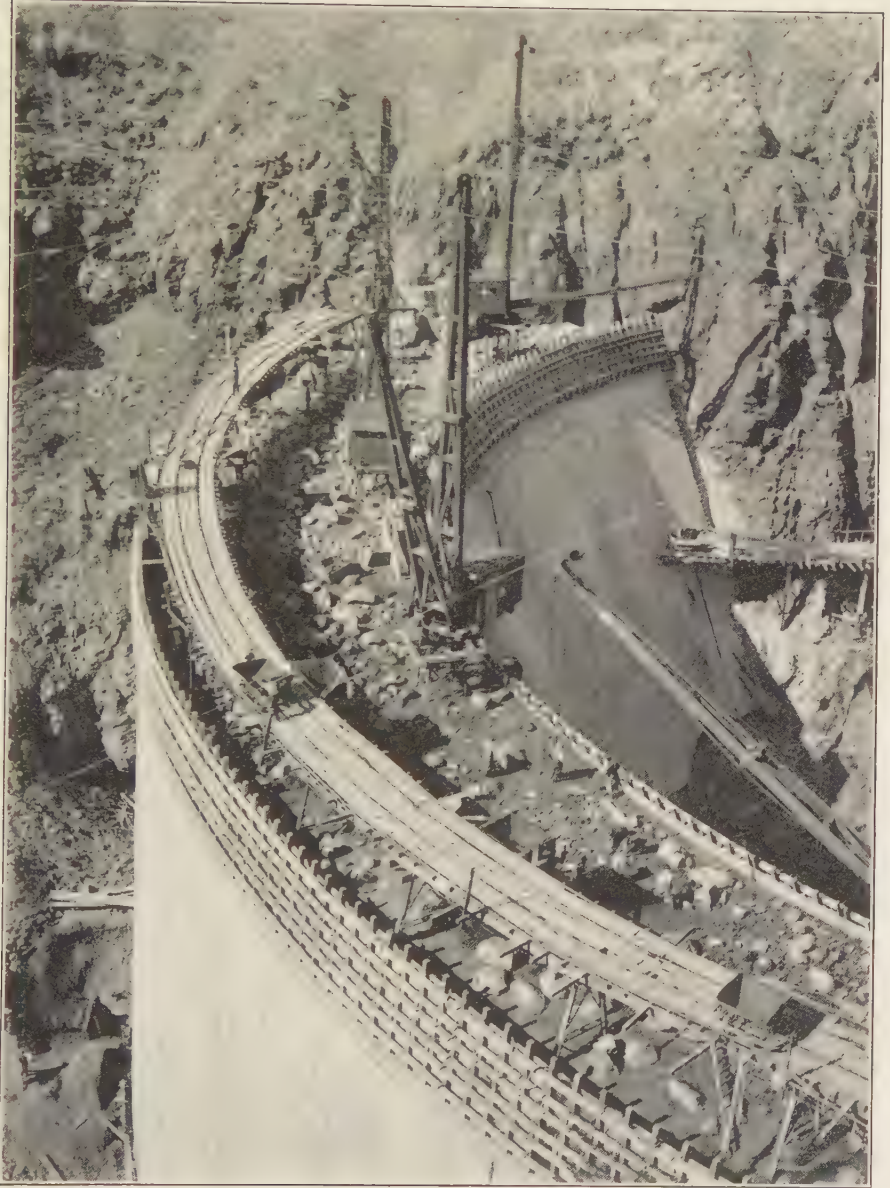
Cascades are like the sparse wood lots of New England. For this desert soil needs only moisture to bear crops more abundantly than any other land in the United States, except perhaps that of the rich Yazoo Delta of the Mississippi.

If we follow up this beautiful valley we will see great ditches running down it, from which lead off smaller ditches, and finally the sluices from which the land is flooded or in which the water is allowed to stand and soak into the soil.

Further up the valley we come to a great reservoir made by damming up a mountain stream. The huge dam is built as the old Romans used to build, for all time. What a task it was to chain the river by this great structure of cement and stone, far away from the towns, with all the difficulties of bringing in labor and material and supplies! Certainly those settlers who live in the valley below, prosperous as they seem to be, could not do such work, which must have cost a million dollars or more in money and several years' time in building.

No, this is Government work; and if we could go about the West together we would find many such great dams, some of them completed like this one, others now being built, and still others which are planned but scarcely yet begun. This is the work of the Reclamation Service whose task is just what its name implies — the reclaiming of the desert soil by bringing water upon it, and so making orchards and fruitful fields and happy homes where desolate stretches of sagebrush used to be, and where even the jack-rabbit and the coyote had a hard time to get a living. The work of the Reclamation Service, like that of the Forest Service, is something about which we all should know.

About ten years ago a law was passed which provided that the money received by the Government, from the sale of land for homes and other uses within the Public Domain,



We would find many such great dams, some completed, others
now being built

should be used to build these great irrigation works; and that the land thus irrigated should be sold at a fair rate to settlers and paid for by them little by little, as they established themselves, and their farms became productive. To make it sure that no one man or no group of men could monopolize these irrigated lands, the law provided that only enough should be bought by one man to make a good home upon which one family might live comfortably.

The work of the Reclamation Service, like the work of the Forest Service, has its difficulties, for men are selfish when it comes to land as they are when it comes to timber; possibly even more selfish, for the greatest hunger that man knows, after the hunger for food itself, is land hunger. So the Reclamation Service has its troubles with the interests which would like to build these irrigation works and sell the land thus irrigated at an excessive price, or hold it all themselves; but like the Forest Service, the Reclamation Service is understood and esteemed by the American people, and under the leadership of its devoted and efficient Director, Frederick Haynes Newell, it is doing work of incalculable value to the West and to the whole nation.

The story of the Reclamation Service and its engineers and of what they have accomplished in the face of difficulties which sometimes seemed greater than men could overcome, is another of the things we may all be proud of as Americans. Its engineers have floated in frail boats down unknown rapids, traveling for days through canyons a mile deep where men had never gone before, in order to find the place where a dam might best be built. They have tunneled through a great mountain in order to carry a stream away from its natural bed and lead it to where it could irrigate more land, and thus make a larger number of homes. They have borne and are bearing heavy responsibilities stead-

fastly and most efficiently, and their claim on our admiration and our support is very great.

When the work of the Reclamation Service is done, and it will take a hundred years to finish it, it will mean that enough land will be irrigated to grow food for two million families. That means, in turn, that two million families,



They have tunnelled through a great mountain

instead of crowding still more the thickly settled regions of the East, may then live upon lands which can now support only a handful. But the success of this great work hangs absolutely upon the permanent protection of the forests at the headwaters of the streams across which the Reclamation Service is building its dams. Were it not for the forests which regulate the flow of these streams and keep their waters clear, there would be floods which the dams could not hold, followed by low water, and the dams themselves would fill up with silt.

Three Great Problems.

These are the three great problems of the Public Domain; the problem of using wisely the forests within it, which has been solved by creating the National Forests and by handling them in the interest of the whole people; the problem of irrigation, which has been solved by building Government dams honestly and efficiently, and by selling the land in small lots to real settlers; and the problem of the public range, which is as yet unsolved, but with a solution ready which will be put into effect just as soon as Congress can be brought to feel the urgent need. There are other problems which must be settled before the Public Domain is wholly safe from greed and held wisely in trust throughout for the nation to which it belongs. Later on, especially if you live in the West, you will come face to face with these problems; but we cannot go into them now because there is so much else for us to see and learn about the land we live in.

So we will leave the great Public Domain, which has within it — in its vastness, in its brave traditions of early struggles with Indians, hunger, and thirst, and in the call it still makes upon all men who succeed within it for courage and vigor and initiative — so many of the characteristics which we have rightly come to call American.

CHAPTER VI

THE TREASURES UNDERGROUND

THE forests, the crops, and the fertility of the soil itself are renewable. But the processes of Nature in mineral making are so slow that we cannot count upon any important increase in the supply even in the lifetime of this Nation. Once the minerals are gone, they are, so far as we are concerned, practically gone forever.

When people speak of minerals, we often think only of the precious minerals, like gold and silver. We are likely to forget the minerals which are not precious in the sense that we do not make watches and jewelry of them, but which are far more necessary to our happiness and to our existence than all the precious minerals put together. These are coal, and iron, and oil.

Think what it would mean if we had no coal. What would happen? We would burn wood, instead, so long as it lasted, and although we would suffer great hardship our existence could still go on. Of course, without coal, even while we still had wood, most factories would have to shut down, few of the trains could run, and there would be no gas to light our cities, except those so fortunate as to have an available supply of natural gas. The cities themselves would dwindle and men would live farther apart. The ocean liners and the steamboats would have to stop, and it would take six weeks to sail to England, even with fair winds, instead of as many days. A great ocean liner burns five thousand tons of coal on one trip, the amount in



From photo, copyright 1903, by Underwood and Underwood

Mining copper, a mile underground

an average acre of coal land. The Pennsylvania Railroad burns six acres of coal in one day. Where there was no water power available there would be no electricity to light cities and houses, and to run street cars and suburban lines, and to do that great part of the work of the country which electricity is now doing.

Still men could exist, although they would live much as our forefathers did, for without coal most of the growth in industry and in transportation, and the increase in comfort and luxury which the last few hundred years has seen, would not have been possible. But we would not live happily, as people lived in the Colonial days and before, for they did not know civilization as we know it.

Those were the days of the stage coaches, and the great estates, and the many servants, when most people lived in the country, and the towns as yet were small and of little importance in the life of the nation; the days when what we call "business" in the modern sense had not developed; days when men were much more independent of each other than they are now; days which are beautiful to look back upon, but in which it would not be beautiful to live, for us who profit by the great strides which mankind has made between that time and this twentieth century. It is an easy and a pleasant thing to go forward with the march of civilization, but a terrible and a lamentable thing for any man or any nation to go backward with it.

What would happen when the wood was all gone? Gone it soon would be, for if we had no coal the one hundred million people in this country would use up all the forests, big trees and small, for firewood in a very few years, provided we got no coal from other countries; and we could count only very little upon them.

Once the forests were gone as well as the coal, there would begin in America a period of the most terrible suf-



From photo, copyright 1903, by Underwood and Underwood

At the mouth of a copper mine

fering the world has ever seen. First would come a movement southward, for men could not withstand the rigors of our northern winters without fires to warm them. Remaining sources of heat, like oil, natural gas, and electricity generated by water power, would rise to such famine prices that only the very rich could buy them.

After the South was reached, and men forgot the bitter cold from which they fled, what would they find to do? Practically every mill would be shut down for there would be no fuel to feed them; trains would stop, and nearly all manufacture would cease. People would crowd into the cities, and then would come the lawlessness which often follows when panic-stricken men herd together under stress of some great fear — as, on a vastly smaller scale, in times of earthquake, as in San Francisco, within besieged cities, and on sinking ships.

Try to imagine the suffering and the slow, terrible death of one man, alone upon a desert island; multiply his suffering one hundred million times, and mingle with them the terrors of pestilence, and you will get a faint picture of what America would be if we had neither wood nor coal.

It is better that a man should die than live in such times; and every man who wastes coal, either in using or mining it, goes just so far toward increasing the possibility that such times will ever come.

Now let us go and see for ourselves how men are mining the coal which we must always have, not only in order to live happily, but to live at all.

In a Coal Mine.

It is a short journey for those of us who live in the East into the great coal fields of Pennsylvania from which comes over half the coal mined in America. We do not

travel far before we realize that we shall not see much that is beautiful, for the coal country is unlovely almost beyond belief. By day we see melancholy fields and denuded forests, with grimy villages clustered around the black mouths of the mines. Gaunt factories and glowing blast furnaces are frequent; for where the soft coal is found, there are the steel and iron makers. Between the mining towns over which hangs a pall of smoke from one year's end to the other, we breathe with relief the sweet night air of the open country, and are thankful for the fields and forests which the miners have not yet disturbed.

As we near the mine which we are to see we meet gangs of men, the whites of whose eyes show strangely in their grimy faces, and who talk a medley of strange tongues. For of the million miners in America, only half speak English, and two-thirds are of foreign birth, chiefly Italians, Russians and Poles.

These gangs of men have just finished their eight hours' shift. In the coal mines work seldom stops, and each twenty-four hours is divided into three working days of eight hours each, so that as one gang of miners leave, another gang takes its place. Eight hours under ground and sixteen hours above ground is the coal miner's average day. The time under ground is spent in the hardest labor that any great body of men have to do.

Now we are at the head of the shaft, for the mine we are going to see is what is known as a "shaft" mine. Coal mines have either vertical shafts to reach the coal, or they tunnel into the coal from the side of a hill, so that cars can be hauled straight out of the mine. There is not much to see so far, except a square hole in the ground about ten feet across and lined with timbers, which stretches downward until its outlines are lost in the darkness. To one side is an engine house, which evidently operates the eleva-

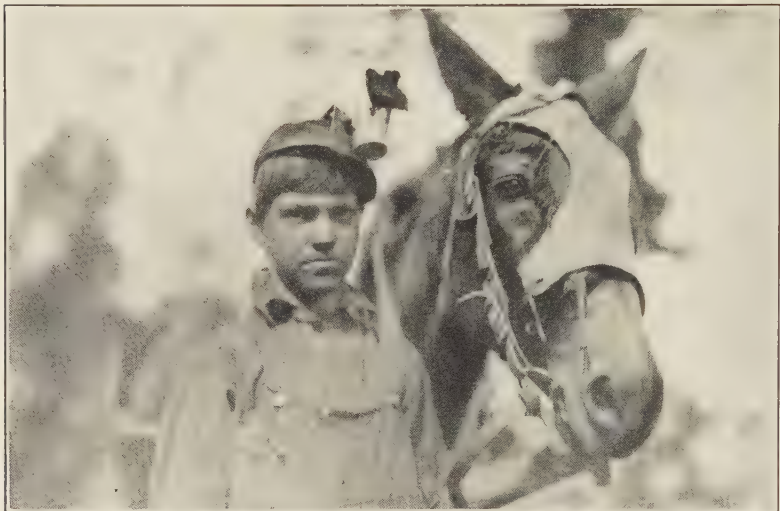
tor, or what miners call the "cage," by which men and coal are raised and lowered from the surface to the mine workings. Nearer still to the mouth of the mine, but so protected as to be out of range in case of a mine explosion, is a great wheel which looks a good deal like an electric fan, except that it is fifteen feet across. It is kept whirling night and day to pump fresh air down the shaft. A railroad siding near by, the cluster of miners' cabins, the company's offices, the whirling fan, and in the midst the black hole in the ground—it is hard to believe that below lie fifty miles of mine tunnels in which three hundred men and fifty mules are working, some of them seven hundred and the rest eight hundred feet beneath where we stand.

Now we are in the cage which drops rapidly down; and we learn a little of how a man must feel who falls from a tall building or shoots the Horseshoe Rapids in a barrel. The car stops with a jerk, and we leave it without reluctance.

Before us stretches a tunnel, supported by timbers a foot thick and about eight feet long, which are set upright from floor to roof. The tunnel is dimly lit by electric light bulbs, and down its length as far as we can see is a miniature railroad track, over which big mules haul little cars loaded with coal which the cage delivers at the top of the mine nearly as quickly as it brought us down. We have n't time to go to the end of this "intake" as it is called, which is practically an avenue in this underground town, and nearly three miles long from end to end. To the right, to the left, and behind us are other "intakes" coming together at the mine shaft like the four avenues which meet in a city circle, and down each twinkle the electric lights and stretch the steel rails of the truck line over which the coal makes the first lap of its long journey to the user.

We follow one of these avenues, and before long we come to a cross street running to right and left. About one

hundred feet further is another and then another and another, all about the same distance apart. We walk down one of these streets which bisect the main avenue, and which average about two hundred feet in length; leading off from it are "rooms," about ten feet wide and twenty feet long, in which the actual coal mining is going on. In



A boy driver and his mule, in a coal mine

each of these rooms are miners, usually two in each, sometimes standing upright when the vein of coal is thick, bent over or working on their knees when it is shallow, swinging their picks against the wall of coal — "undercutting" it, so that it can be scaled off in huge chunks by blows above, shooting it with explosives, doing by the light of the lamps in their hats the hardest work men follow in America.

We have seen on our journeys together men working under many different conditions. We have seen the lithe, tanned riders of the plains, whose charges are the great herds of range cattle. We have seen the active, muscu-



In one of the "rooms" of a coal mine

lar loggers, facing cheerfully and successfully the heavy task of getting big logs out of difficult country. We have seen the farmers behind their plows. Everywhere we have found men toiling. But never have we seen men who work as do these miners.

The air is heavy and full of coal dust, in spite of all that is done to keep it pure and wholesome. For the dust rises constantly from the coal-cutting machines, is ground out by the feet of the mules, puffs out in clouds when a "shot" is fired, and more and more is freed by every blow of the miners' picks. In this dust lies not only discomfort for the miners, but the most frequent cause of mine disasters, for coal dust is highly inflammable and very slight causes will ignite it. An electric spark from crossed wires, the flare from the open lamp in a miner's hat, a heavy charge of powder used to bring down the coal — any of these causes may convert in an instant the busy workings of a mine into the scene of an unspeakable tragedy.

Waste of Life and of Coal.

As we pick our way through the "rooms" and "streets" and "intakes" of this great mine, it strikes us that about as much coal is left untouched as is mined and taken away. An enormous quantity remains to support the roof of the workings, which may be cheaper for the mining company than supporting them with timbers, but certainly causes great waste; for once abandoned, this mine is not likely ever to be entered again for mining. We also see that, like many lumbermen, the coal miner is apt to take the best and to leave inferior stuff, simply because it does not pay him as well to take it out, although much of it is fair fuel for many purposes and could be mined and sold at a reasonable profit. As a matter of fact, in soft coal mines, about

as much is wasted as is produced. This waste is being gradually reduced by better methods of mining, but it is still far larger than it should be. But the most terrible waste in coal mines is not of the coal itself, but of the life of those who labor there.

Have you ever seen twenty thousand men together? Very few of us have, except those who have seen the field maneuvers of great bodies of troops, and even then it is seldom that twenty thousand men are all in sight at one time. Have you ever thought what twenty thousand men mean to this country, as well as to their own families whose support they are? Twenty thousand men with tools in their hands, and strong arms with which to use them? Twenty thousand individual sources of energy and development and usefulness and achievement, even if that achievement be no higher than mining the coal we use? Such an army of workers is a great force in the world; a force so great that it is difficult to estimate its value to this nation in mere terms of money. Ten years has seen this force destroyed in coal mines alone, for in the last ten years more than twenty thousand coal miners have lost their lives in mine disasters. And the same ten years have seen fifty thousand coal miners injured, many of them for life. These figures are for coal mines only. They do not include metal mines, in which from five hundred to one thousand men are killed each year. In proportion to the number of miners employed, more are killed and injured in American mines than in those of any other country in the world.

Mining is one of the most hazardous of occupations, and some loss of life is inevitable in view of the enormous number of men employed, which reaches over a million; while two million more are engaged in handling, transporting and manufacturing mineral products. But the appalling death roll is due very largely to disregard of the dangers

ever present in mines, which older countries have learned to guard carefully against through bitter experience. There is much carelessness, as to ordinary precautions, on the part of mining companies and of many miners themselves; while very few states have as yet done their full duty in passing and enforcing laws compelling both miners and mine companies to be more careful. The danger steadily increases,



After the explosion. At the mouth of a coal mine, after a disaster which killed 356 men

for as our demand for coal grows larger and the supply dwindles, the mines are dug deeper and deeper, more gas is encountered, and more and more untrained men are employed to keep pace with the demand for more coal.

We have seen a forest fire, in which there is a certain magnificence in spite of its terrible power to destroy. But we shall not see a fire in a mine because there are some things it is better not to see, unless we can help by seeing them. From the haggard little group of wives and mothers at the mouth of the black shaft to the reeking pit below,

in which men lie sometimes shattered unspeakably by the force of explosion, the story of a mine disaster is heart-rending beyond all words. It is all the more heartrending because often it is a story that need not have been told, had it not been for the carelessness of some mining company,



Waiting. The crowd near the mouth of the shaft after a disaster in a coal mine

or even some state, whose first duty it is to see that careless mining companies are forced to be careful.

Did you ever realize how long fires burn in coal mines? There are fires burning in coal mines to-day which have been burning more than twenty-five years. Near Summit Hill, Pennsylvania, a mine fire burned fifty-one years and destroyed twenty-six million dollars' worth of coal. Near Jobs, Ohio, a tract of coal valued at several million dollars has been burning since 1884. At Deadwood, South Dakota, a million dollars has been spent in fighting fire in a copper mine.

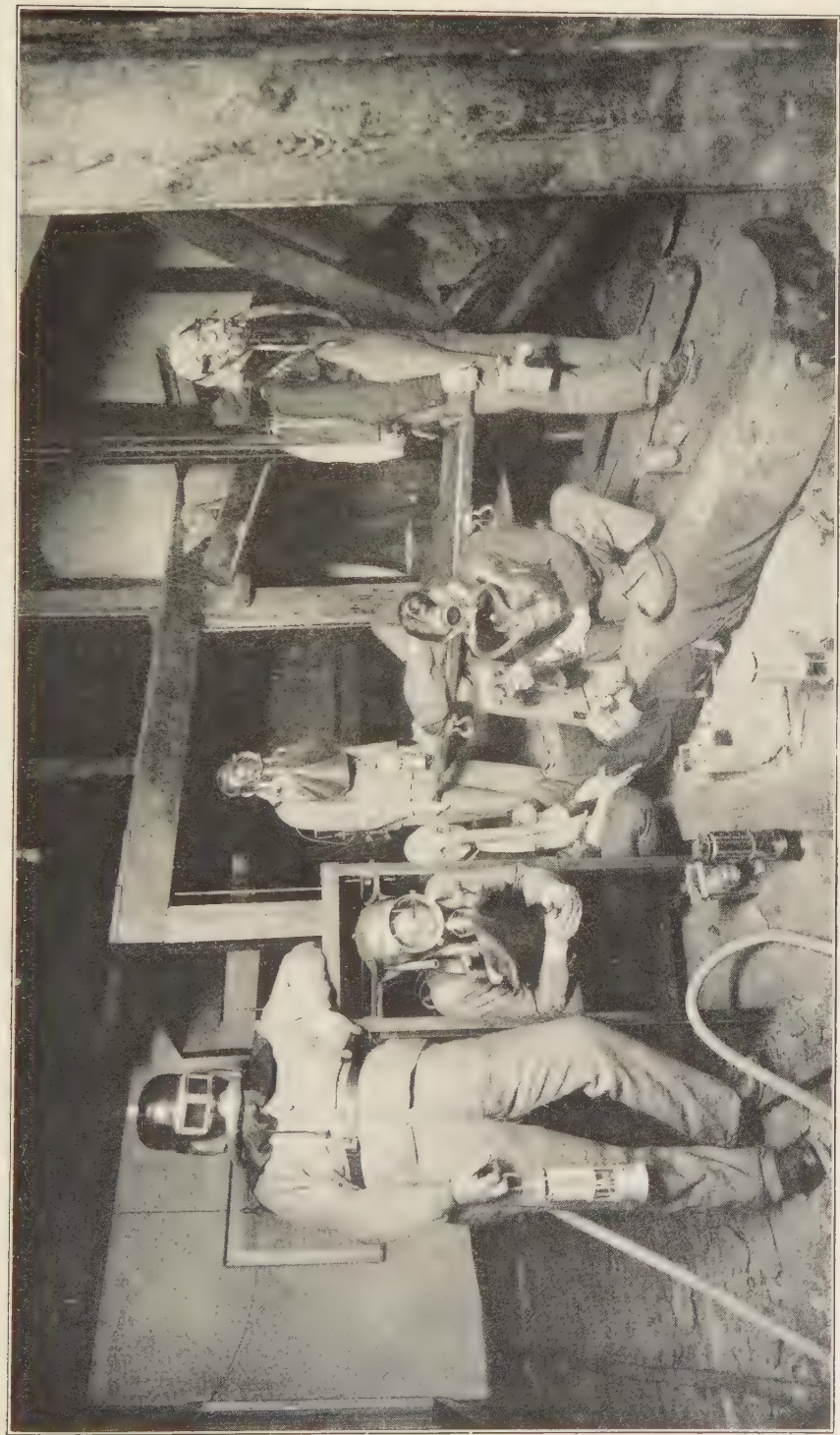
The Bureau of Mines.

So it is clear that, in spite of much that has been done already to preserve life and to check waste in coal mining, much more remains to be done before we eliminate unnecessary waste either of life or of coal.

The most powerful agency for bringing about these great reforms in the mining industry is the United States Bureau of Mines, whose chief, Dr. Joseph A. Holmes, has devoted many years of his useful life to a study of methods for the prevention of mine disasters. His Bureau is just as much a life-saving service as is that Bureau of the Navy Department which maintains life-boat stations and their crews along our coast.

The Bureau of Mines has three great fields of activity. The first is to study the causes of loss of life in the mines and the best methods of preventing it. The second is to make similar studies of the causes and the best methods for preventing unnecessary waste of minerals in mining and in use. The third task is to give prompt and effective assistance on the ground when mine disasters occur. In the three years since this government work began, the average yearly deaths in coal mining have been reduced by one fourth.

The Bureau has equipped several mine rescue cars, which are constantly traveling through the important coal fields. On each of these cars is a crew composed of practical mining experts trained in mine rescue and first aid methods. So soon as word of disaster is received, one of these cars is rushed to the scene to share and often to direct the work of life saving, and to get all possible information regarding the cause of the disaster as a basis for the prevention of similar disasters hereafter. It is a task which is noble in its purpose and most efficient in its execution. Like the



How the trained men of the Bureau of Mines are equipped to save life in mine disasters

work of the Forest Service and the Reclamation Service, the work of the Bureau of Mines has great and growing usefulness, above all because it deals with the problems of an industry not from far off, but practically, and on its own ground. Like the rangers of the Forest Service, the crews



Photo by Dobbs

Mining gold in Alaska

of the rescue cars maintained by the Bureau of Mines must face hardships and great danger in their work. In April, 1911, brave Joseph Evans, a foreman on one of the mine rescue cars, lost his life from exhaustion, through his heroic disregard of self in his efforts to save life after a terrible mine disaster near Throop, Pennsylvania.

We have all agreed that figures are puzzling things, and that when they are huge figures we are sometimes apt to lose their real significance. So let us omit the billions and

even trillions of tons which represent the extent of our mineral resources, and see what the best informed men say regarding how long these resources will last at the present rate of consumption and of waste. These after all are the facts of real importance.

These men say that if we go on as we have been going, at the present increasing rate of consumption, the easily accessible supplies of coal will be exhausted in a little over one hundred years, and the entire supply will be exhausted in about one hundred and fifty years. Of course, as a matter of fact, we will never actually exhaust our coal supply. As the supply decreases the price will rise, and we will be forced to the economies which we are merely talking about now, instead of practising. But the need of making the supply last longer is a very real need, because the quicker the coal goes the greater will be the scarcity and the higher the cost of coal to each of us.

The iron ores are much nearer to exhaustion than the coal. If consumption goes on increasing as it has in the past, we will have used up all the high-grade iron ores within fifty years. So in the case of the most important minerals, the coal and the iron, like that of the forest, we are not yet living within our means.

CHAPTER VII

WILD LIFE

HERE we are in Germany again, this time in Frankfort, on the River Main, a prosperous city of half a million people.

At first Frankfort interests us, but not for very long. Great towns are much alike the world over, and there is no striking difference between a street in Frankfort and one in Boston, or Chicago, or New York. When we have seen the ancient buildings, which are the only important things which Frankfort has and which most American cities lack, we wish for the open country, as one always does who is not used to towns. We hail a cab driver and tell him to take us for a drive in the park, if Frankfort happens to possess one. He tells us Frankfort has a very beautiful park, but that he thinks we would enjoy still more a drive in the forest, or the "Frankfurter Wald," as he calls it.

We are standing on a cement pavement as we talk with this cab driver. Street cars and automobiles are constantly passing; big buildings are all around us, and the roar of a great city is in our ears. We find it hard to believe that there is a forest so near. Only half convinced, we climb aboard the old-fashioned, roomy vehicle, and the horses jog off.

The driver is right. In half an hour we drive straight from the town into a great forest much like those we saw before in Germany, except that there are still more roads, and the woods are, if possible, even better cared for. But

after all it is a real forest and not a park. We pass plantations, and wood-cutters at work, and stretches of dense young growth where the old forest has been felled, and a couple of great forest nurseries, which makes it clear that this forest is for use and not merely for show.



Photo by George Shiras, 3rd

The midnight reflections of a white-tail deer

If we had time we might go to other cities in Germany, and to the smaller towns, and even to many of the villages, and near most of them we would find, as in Frankfort, forests whose owner is the city, the town or the village. Some village forests are so productive that the sale of the wood raised in them pays many village expenses, like the cost of lighting it and keeping its streets in order.

As we drive through this beautiful forest of Frankfort we meet many people who are enjoying it like ourselves.

We meet brilliantly uniformed officers on horseback, and well-to-do citizens with their families, rolling along in comfortable carriages, and other citizens taking their pleasure on foot. The thought strikes us, what a fine thing is a great forest at the edge of a great city, where men and women may get pleasure and health, and where the children may play all day!



Photo by George Shiras, 3rd

A long swim. A caribou crossing a lake in Newfoundland

Parks are vastly better than nothing, but this City Forest means so much more than a park. There are no signs warning us to keep off the grass, and there are shady, winding paths, instead of cement walks, and the clean, sweet scent of the woods is all about us, and there is the freedom from the sight of the buildings and from the city noises which a park so seldom gives.

After awhile we tire of driving, and the wish possesses us to explore this beautiful forest on foot. So we leave the carriage and take haphazard the first trail leading from the road.

The Roe Deer and the Ranger.

Soon we are in the deep woods, and, for all the sight or sound we get of it, apparently many miles from the great city which throbs and hums only half an hour away. That is what the Germans would say in speaking of the distance, for over there they speak of the length of a road or a trail as the time one needs in which to walk or drive it.

It is a very good way, because it tells what one really wants to know, which is, not how far it is, but how long the trip will take.

The trail leads us down a deep ravine and then into a little grass-covered opening in the forest. Grazing within it we see a group of the delicate, beautiful little roe deer, whose natural home is throughout Europe. The bucks weigh only about seventy pounds, and the does are even smaller. When we are within about fifty yards they scamper away in earnest, and leave us to wonder what deer are doing in such a place. We make up our minds that there must be a fence although we fail to see it, and that these little deer are kept here for people to look at, as they are in some parks at home.

A little further down the trail we meet a forest ranger, who is a very grand looking person. He wears a green uniform, cut as if he were a soldier, and theatrical-looking top-boots, and at his side hangs a short sword with an ivory hilt, and on his head is a jaunty green felt hat with a rosette on the side, made of the long hair from the breast of the chamois. How our rangers on the National Forests, in their serviceable uniforms, cowboy boots, and rough gray shirts, would laugh at him! And if they had him on the fire line, or put him to packing a horse, or taking care of himself in rough country, they would laugh at him still more. But if he had them in the Frankfurter Wald and set them

to caring for forest plantations, and to directing some of the elaborate forest cuttings, or to building stone roads, instead of their own rough trails, the laugh might be on them.



Photo by George Shiras, 3rd

The end. Mortally wounded during a snow storm, this deer was not found by the hunter

We tell this ranger about the deer, and ask where is the fence which encloses them.

"There is no fence," he says. "The deer you saw were running wild; there are several thousand of them in this forest, and each year many hundred are shot by sportsmen and used for food. The yield of deer here is studied and taken just like the yield of wood. Only the increase is killed. We do the same thing with the hares — big brown fellows, the kind you call Belgian hares in America; this forest

is full of them, and the yield is well over a thousand every year. In the aggregate the income each year from game from the Frankfurter Wald is many thousand of your dollars."

Then this ranger goes on to tell us that what is being done



Photo by George Shiras, 3rd

A happy family

with the game in this forest is done in all the forests in Germany. He is a well-informed ranger, and he gives surprising figures as to the income from game alone in the German Empire. He points out that the care given the game, and its recognition as a great resource, means much more than mere revenue. It materially increases the local food supply, and it enables poor people as well as the rich to eat game, for in Germany venison costs very little more than beef or mutton.

Of course, it is all very different from what we are used to at home. Germany has no wild land, in the sense that our Public Domain is wild and open to any one, to hunt or fish upon and to take away what he kills or catches at no cost except what he pay to the State for a hunting or fishing license. In Germany, the license carries the right to kill the game but not to take it away, so that a man pays first for the license, and then for the game itself, at so much a pound, since all game is recognized as the property of the State.

A Royal Hunt.

The elaborate way in which hunting is done in Germany would amuse those Americans who are accustomed to do their hunting alone, to finding their own game, and to bringing it in unaided. But the Germans love to make a beautiful picture of everything, from a regiment of lancers in their jaunty uniforms with penants fluttering from the shafts of their lances, to a forest scene in which huntsmen are the actors. Even the killing of one little roe deer calls for several green uniformed rangers to act as beaters, and for many toasts and hunting songs after the hunt is over.

Strangely enough, often the more distinguished a German is in his own country, the less his hunting partakes of the nature of real sport, according to American standards. For example, when members of the Bavarian Royal House go hunting, they usually visit a preserve in a great forest region called the Spessart, where five thousand acres have been enclosed in a strong fence and well stocked with red deer and wild boar.

If boar are to be killed, preparations begin several weeks in advance. Beaters drive the boar within a strongly fenced enclosure of several acres convenient to the hunting lodge.

From this herd the finest tusked are selected up to the number to be killed, which is generally about one hundred. These are driven into a still smaller enclosure, about two hundred feet long and half as wide. In the middle is a little stockade about breast-high, made by driving stout poles into the ground, and just large enough to hold the hunters and a bearer to load and hand him his rifle.

When the hunt begins — and it is a very grand occasion indeed — the distinguished visitor is escorted with much ceremony to the little stockade. Then the boar are driven up and down the narrow enclosure until the hunter's high-power rifle lays them all low. The royal huntsman is then warmly congratulated by his retainers upon the certainty of his aim, and the hunt is over until another season.

But in spite of this parody of sport among some of the aristocracy, most Germans are keen sportsmen, like most Americans; and thanks to their wonderful capacity for getting the most out of everything by skilled methods, their small, densely populated country contains abundant game.

The Young Germans in New York.

Now suppose that instead of being Americans in Germany we are a group of Germans seeing America; young Germans, accustomed only to the conditions of their own country and who for the first time are visiting ours, of whose size and great resources and wonderful prosperity they have heard so much.

These young Germans set out to see New York, as we did to see Frankfort. For awhile the skyscrapers and the subway and the teeming life of the busy streets chain their attention; but it is not long before they seek, as we did, some respite from city sight-seeing.

They are well-to-do young Germans who have had plenty

of hunting at home, where hunting is so easy and game so plentiful; but it occurs to them that now is their chance, not only for an outing, but for some sport along with it. They paint glowing pictures to each other of how fine a thing it will be to carry back home great game heads and pelts; and what a jollification there will be when they get back and the health of the mighty hunters in foreign parts is drunk in fragrant Rhine wine!

So they get out their heavy rifles, of which both wood and metal parts are richly ornamented, and their "Rucksacks," which are canvas bags fastened across the back by straps around the shoulders, and their elaborate hunting clothes and hobnailed boots.

The next question is, where shall they go? They look up the hotel clerk, who is the only substitute they can find for the attentive and well-informed host of the little inns they know at home.

The hotel clerk at first takes his questioners to be crazy. Here is a group of young men in Robin-Hood-looking clothes, the like of which he has never seen before in the biggest hotel in one of the largest cities in the world, and they are asking him casually to tell them, please, where they can go to kill a deer!

This hotel clerk has never seen a deer except in a zoo, and his most thrilling hunting experiences have been confined to the days of his by-gone youth, when he used to shoot an occasional rabbit, or a still less frequent grouse. But at last it dawns upon him that all that his questioners lack is a knowledge of America. So he enlightens their ignorance, and tells them that the days in which men could do successful deer hunting in the immediate neighborhood of New York have been over for a trifle of a hundred years or so. He suggests as a compromise a short trip by rail into the country, where the elusive squirrel might be found, and he

furnishes the young Germans with a letter to a farmer over whose lands, as a boy, he carried a shotgun.

Two hours finds our Germans leaving the train at a sub-



Photo by Julian A. Dimock

Not sure what's going to happen

urban station in the wide strip of small farms which fringe New York. They plod along the dusty road to the farmer's house, and find the old farmer taking his ease on his porch

after dinner. They present their letter of introduction and explain that they have come to hunt. They get a warm welcome, but little encouragement as to the chance of a full game bag.

"You see, boys," says the old farmer, "the game don't have much chance near a big city or wherever many people live. When I was a boy like you, I heard tell from my own grandfather of the time when it was an easy chore to go into the marshes along the creek on this very farm and shoot



Photo by Julian A. Dimock

Find three wild turkeys!

a fat buck and bring him in, all in a few hours. But the last deer killed in this section was shot by my father about fifteen miles from here, on what was then a big forest tract; and that was fifty years ago when my father was a young man. There are the horns over the front door, and a fine pair they are. A good many have tried to buy them, but I never could see my way to part with them.

"Small game? Well, it used to be plentiful, but there is mighty little of it left. The turkeys are gone, and the pheasants, which those scientific fellows call "ruffed grouse," are about gone too; the hunters from New York keep the quail pretty scarce, and boys don't give the rabbits much chance. There may be a few squirrels left in my woodlot, for squirrels are hard to find and not very good to eat. I saw two one day last week, but the woodlot is pretty big and the squirrels are few and small; besides, you have n't got any dog to tree them with."

How the Game has Dwindled.

The hopes of the young Germans fade rapidly as the old farmer describes what has happened to the game. It is a new story he tells them, of how a great nation has wasted a



Photo by Julian A. Dimock

A baby moose

resource which costs nothing, and which, if it were taken care of, would yield perpetual pleasure, as well as useful food, to so many. The farmer takes pains to explain how the game has dwindled, because he likes these young Germans with their eager questions and their no less eager attention to all that he has to say. Besides, he is a thoughtful man, and he has been in the West to visit his own children, who settled there, and so he has seen much of his own country. He tells them how well within his own mem-

ory there used to be plenty of moose in that great forest region in Northern New York, known as the Adirondacks, but that now a moose is as scarce there as it is in the streets of New York.



The antelope are now so nearly gone that some states forbid their being killed at all

The farmer goes on to tell how the antelope on the great plains are so nearly wiped out that in order to keep the species in existence some of the Western States have passed laws forbidding the killing of any antelope at all. He describes how the elk have been slaughtered, and how every winter many hundred starve to death for lack of winter

forage. In the old days they had plenty to live on, but now the sheep and cattle eat the ranges clean in the summer, and when winter comes the elk find nothing to feed on.



Photo by Charles D. Walcott

In the velvet. Mr. Walcott photographed these elk in the early morning, when they were investigating his camp



Photo by Julian A. Dimock

Catching the Bronx Zoo crocodile

He makes it plain that in America big game hunting is fast becoming a pleasure which only the rich can enjoy, or those few who live in the remote regions in which game still abounds; but that for the average man the killing of a moose or even an elk means an outlay of several hundred



Photo by Julian A. Dimock

What kindness will do

dollars or more in railroad fare and the hire of a guide, and the other expenses incident to a journey into the wilderness. He surprises them by the statement that only a few of the young people in America have ever seen big game, except in a zoo or in a photograph. And he draws vivid pictures for them of what a natural home for game are the Southern mountains, and the Catskills and the Adirondacks, and the far-off mountain ranges of the West.



More kindness. The man feeding the bear cubs is a Forest Supervisor in charge of one of the National Forests



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The man holding the Manatee, or sea-cow, is Mr. A. W. Dimock, to whom all Americans owe a great debt for his wise and vigorous efforts for the preservation of the wild creatures

Photo by Julian A. Dimock

He makes it all very clear to them, and at last, foreigners as they are, they begin to see why it is that America's game is going much faster even than her forests. The old farmer



Forty years ago there were five million

makes them understand how the zone of gameless, almost birdless, country is widening year by year around the towns under the onslaught of those who measure their sport wholly by the number of what they kill.



A moose at bay

Photo by Frank F. Liebig

And as the old farmer leads them about the United States they see through his eyes the passing of the birds and the woods creatures, under the merciless fire, in season and out of season, of countless rifles and shotguns with irresponsible men and boys behind them.

This old farmer does not lack for figures, and some of them stagger his hearers. He tells them that forty years



Photo by Frank F. Liebig

A wild goat at home

ago there were not less than five million wild buffalo on the Western plains. To-day, all we have left are a few hundred raised in parks and zoos, and a few hundred more kept semi-wild at public or private expense in the West. He tells them that in six of the Northeastern States alone about thirty-five thousand deer are killed each year.

Then he goes on to talk of the value of America's wild life as a material resource, apart from the health and sport to be had in hunting it. Again he has some surprising figures. The present yearly value, he says, of the furs taken from mink, otter, martin, beaver, muskrat, and other fur-

bearing animals, including what is sent abroad and the still larger quantity used at home, is between fifteen and twenty million dollars.

He explains that although the total value of the game

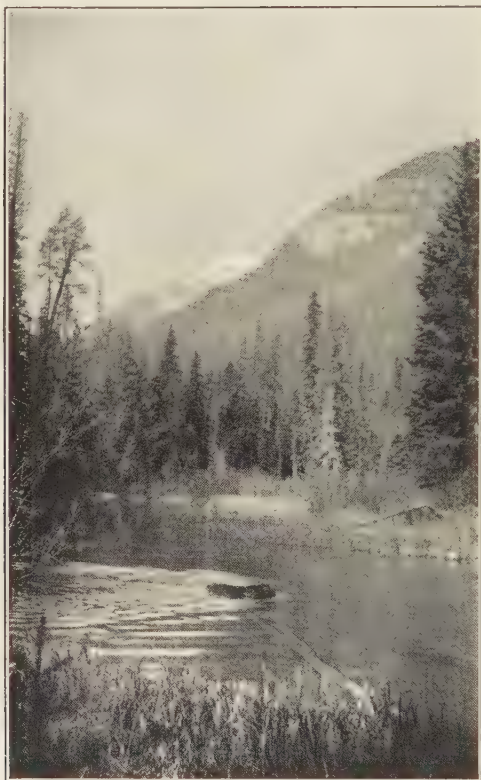


Photo by Frank F. Liebig

A bear swimming a stream

killed for food in the United States each year is not yet known, the venison used in one season in the six North-eastern States he spoke of is worth more than a million dollars. He tells them that, while the requirement for the purchase of a hunting license from the State by those who wish to kill game in America is not yet general, the sale of hunting licenses already yields about three million dollars every

year. He calls attention to a no less important revenue from game which lies in the attraction it offers to visitors. In the State of Maine alone more than a million dollars are spent each year by fishermen and hunters.



Mr. Eugene S. Bruce and his bear. Mr. Bruce caught this cub with his hands, in the California mountains. It is now in the Washington Zoo.

Predatory Animals Cost Us Dearly.

But, as the farmer says in substance, there is another side to this question. The United States is not only suffering already from the lack of useful game animals which its people have destroyed by wasteful use, but from the abundance of those animals which are harmful as well as useless. The need to maintain and increase the supply of valuable game birds and animals is little greater than the need to exterminate those which prey on crops or stock.

In the West, predatory animals, among which wolves, mountain lions, and coyotes are the worst, destroy every year about fifteen million dollars' worth of cattle, horses, and sheep. In Wyoming alone the loss is about one million dollars a year. So heavy is the damage that nearly every western state offers bounties — sometimes as high as twenty dollars for a wolf — for each of the wild animals killed, which prey upon stock. But the most effective way, as well as the cheapest, of getting rid of these predatory animals is the way followed by the United States Forest Service, which hires men to do nothing else but kill them.

So much for the big fellows, but there are others as bad. We have all seen prairie dogs in a zoo, and quaint, harmless-looking little creatures they are. One would not be likely to accuse them of laying waste thousands of square miles. But it takes only about thirty of them to eat as much grass as one sheep, and two hundred and fifty to eat as much as a cow. How many of them there are nobody knows, because their colonies or "dog towns," as they call them in the West, cover many million acres.

There is one dog town in Texas which is over two hundred miles long and from one hundred to one hundred and fifty miles wide. This is about twenty-five thousand square miles of colony, and there are within it an average of at least twenty-five prairie dogs to each acre. If you are good at mathematics you might work out how many prairie dogs there are in this "dog town" alone, and when you get through you will find it is somewhere about four hundred million. In the same state of Texas, prairie dogs consume all the forage upon land which, if the "dogs" were not there, would feed about one and a half million cattle. So you see that for the West as a whole the prairie dog is a good deal of a problem, even if there isn't much of him individually.

Kansas used to have two and a half million acres upon which prairie dogs reigned supreme, and all the other Western States have their full share. In 1902 Kansas got tired of it and made war on the prairie dogs everywhere. The war lasted five years. It cost eighty-five thousand dollars, which was raised by taxes and spent in the purchase of poison. The result was that the prairie dogs were destroyed on two million acres, at a cost of about four cents an acre.



Not much of him individually

Then there are the ground squirrels, the pocket gophers, and the field mice, which together do more harm than the prairie dogs. The best estimate to be had of the damage done by all these little creatures, including rats and mice, in the United States each year is the tidy sum of ninety-five million dollars. The insurance people who deal in carefully recorded facts, estimate that of the average loss each year in the destruction of buildings by fire due to defective wires for electric lights, a large part can be charged directly to the gnawing of the wires by rats and mice.

But to return to game, and before we leave it, let us go a little farther and see what the general outlook is here in America. It is not quite so hopeless as the terrible waste of wild life would lead us to believe.

In their attitude towards game Americans fall into three classes: those who are as yet indifferent to the waste of it, those few who stand for preservation without use, and the growing number who are thoroughly aroused to the need for using the game without destroying it. The indifference



An old buffalo bull

Photo by Charles D. Walcott

of the first class, which is still the largest, arises from many causes, chief among which is ignorance of the vast importance of game as a resource. It is the same careless indifference which those must overcome who strive for the wise use of the forest, the rivers, and the minerals. In certain important respects this indifference is the most serious enemy to any kind of national thrift.

This inertia towards the right use of the game is growing steadily less each year, as people are taught to see what the

terrible waste of wild life means to all citizens and to the nation. Men like Dimock, Shiras, Hornaday, Merriam, Henshaw, and Chapman, and many organizations, like the United States Biological Survey, the National Association of Audubon Societies, the Camp Fire Club, and the Boone

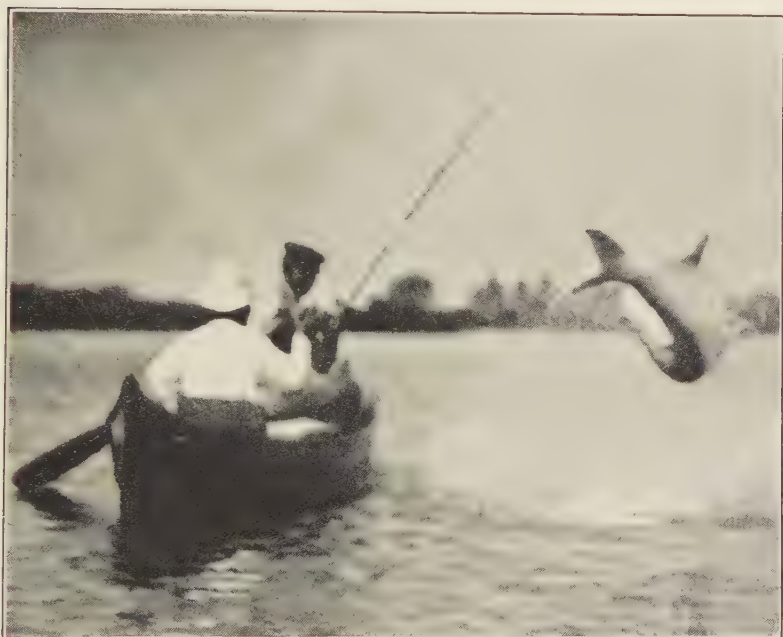


Photo by Julian A. Dimock

True sport. The tarpon has better than an even chance

and Crockett Club are doing pioneer work in the public service in this great field.

On the other side there are, as in the case of the forests, people who are not indifferent to the waste of game, but so enthusiastic for its preservation that some of them would go so far as to make the woods creatures immune from anything more deadly than the camera, and would thereby destroy the legitimate use of game for food and the no less legitimate sport of hunting.

Between these two extremes are those men who see the sentimental side of game preservation without exaggeration, and who also see the side of use in its true proportion. These men stand vigorously for the complete protection of certain birds and animals which are of little use when killed, but which are of incalculable value in making the forest and



A fine mountain sheep

fields more beautiful and more interesting. They stand no less vigorously for the preservation of this great resource, not by locking it up against use, but by using it wisely.

We Can All Help Save the Game.

We can help above all by learning to know the habits of the woods creatures, and what is needed for them to maintain or increase their numbers. The more we learn about the wonders of the wild life which pulses under fur and feathers and pelt, so much the less likely are we to

become what are justly called "game hogs" — men who kill game in quantity far beyond their own needs, simply

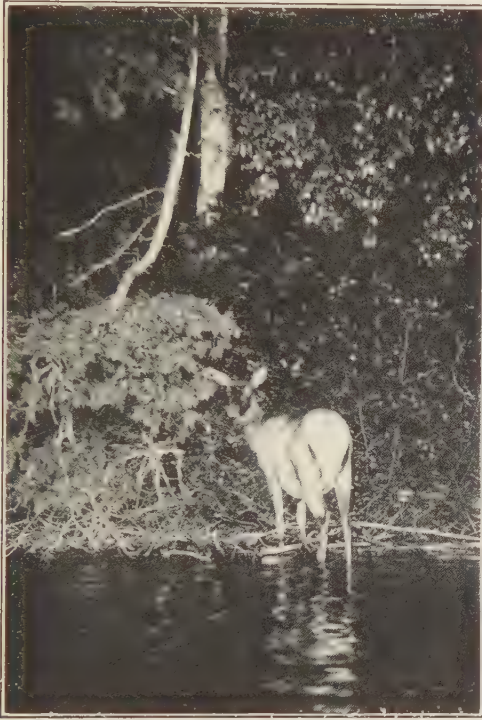


Photo by George Shiras, 3rd

The elk greatly need better protection

to be photographed beside it, or from the unworthy desire for mere slaughter.

The true sportsman is he who gives his game a fair chance, and kills only what he can use without waste. Such a man does not have to move on like the bonanza farmer after he has mined the soil, or like the wasteful lumberman who destroys the forest, but he so husbands the wild creatures that he may hunt successfully over the same ground year after year.

CHAPTER VIII

THE RIVERS

WHILE we may not have been in a great forest, or down in a mine, or have lived on a farm, all of us have seen a river. Nearly every boy has learned to know well a part of some river. He has waded it first and had many a swim in it when he grew bigger. He has fished it and poled or rowed or paddled a boat over it, and the memory of its pools and its ripples, its stretches of placid water which make the good swimming holes, and its shaded banks which are so hard to leave, will remain with him as long as the memory of home itself.

A man who knew how to put truths into words once said that we love to sit by a fire because it is a live thing in a dead room. A river attracts us for much the same reason. It is never still; and the sight and sound of moving water, whether it be the babble of a trout stream or the roar of an angry sea, has a stronger and a more constant charm than any other held by the great world out of doors.

One more Journey.

There could be no more interesting journey than to follow a great river from its source to its mouth. Why should we not take this last trip together? It must not be an eastern river, but one in the West, where every drop of running water is precious — often more precious than either land



Our river first drinks from melting snows

or timber. Why should we not follow down one of the rivers of California, which are useful to man every step of the way?

It takes some hard climbing to reach our river's source. Its life begins in the high Sierras, which are among the most beautiful of mountains. They are not like the Rockies, where the heart is so awed by the tremendous sweep of slopes clothed in the dark green of the western yellow pine that we turn with relief to the valleys, where streams and smooth land contours hold the comforting sense of possible habitation. There is the same contrast between these towering mountains and the pleasant valleys as between the roar and surge of great seas and the murmur of a brook. One may admire and enjoy both, but the brook like the valley is the best to live near.

The Sierras are bold and full of character, but their soil and climate are kindlier than those of the Rockies and their forests are much more varied and more cheerful. On the lower slopes, where summer sunshine streams down the whole year round, grow shrub-like trees of many kinds, some of them with glossy leaves and brilliant blossoms and fruit. This hill country, which lies just east of the high mountains, is like a park, with its rolling hills and rich shrubbery and flowers and pleasant glades. Deer are still plentiful in parts of it, and so are the crested California quail.

Our river first drinks from melting snows, and then of rain water stored by the forest and given out slowly and unceasingly from a multitude of springs. Other streams running down the side valleys of its great watershed help to swell it; and what, a few miles back, was a brook which a child could step across is now a rushing trout stream, which breaks its long journey by loitering in the ripples, resting in deep pools, or making up for lost time in hurrying rapids, and now and then by a waterfall.



Resting in deep pools

The First Sign of Use.

So far we have seen no sign that man is using the river. We see brilliant trout flashing from the shelter of one pool to another so fast that the eye can scarcely follow. But beyond the fish and pleasant visions of a slender rod and a full creel, the thought of using this river does not occur to us.

Now we hear the roar from a long chain of rapids; and from the bank we see the steep pathway down which the river surges for several hundred yards. The stream which we could have swum or waded in its placid reaches just above, is no longer in a mood for trifling. No boat, nor man afoot or mounted, could live in these rapids. Here is the rush and roar of angry, hurrying water, lashing itself into frenzy against the boulders which oppose it, sliding over smooth, steep ledges with a sinister, hidden strength, swirling among great rocks in its hungry, fruitless search for new outlets, and filling its narrow valley with a voice no longer gentle, but full of purpose and of power.

But what is that dark, straight line we see leading from the right bank, at so slight an angle that the distance between it and the stream widens very gradually? As we look closer we see that it is a great pipe line which leads right into the river bed at the head of the rapids. It must carry a great quantity of water, for the pipe is at least three feet through, and where it juts into the river it is entirely submerged behind a short stone dam which diverts the current towards it.

It is clear that not only have men been here, but that they must have had much money to spend and have seen a chance to make more by spending it. To dig and blast this narrow trail for the pipe line which runs down hill just enough to keep the water in it moving, must have cost a lot of money,

as must the great pipe itself whose joints are fitted so tightly together that hardly a drop escapes.

What does it all mean? It means water power. The rapids are the source of it, the pipe line is the first step towards its development. Developed water power means



It is a great pipe line

electricity, and electricity means lights in our streets and in our houses, swift-moving street cars and humming factories, and progress, ease, comfort, and development as well as money for the men who produce it.

It is easy going now, for we follow the trail along the pipe line and are soon above the foot of the rapids, with the river a hundred feet below us. Another few hundred feet and the pipe line turns abruptly downwards at a sharp angle and disappears as it enters a building at the foot of the hill,

and right upon the river bank. This is the power-house, where the pressure of the stream of water carried in the pipe is used to turn great silent engines whose product is electricity. Having done its work, the water gushes out on the other side of the building and joins the hurrying river again.

Leading from the power-house are several large copper



The power-house

wires; and a hundred feet away we see a metal tower about fifty feet high, to the top of which the wires are stretched. This tower is four-sided and looks much like the masts used on modern battleships.

If we were high in the air above and if our eyes were strong enough, we would see a sixty-mile chain of these towers, about two hundred feet apart, bearing the gleaming copper wires which carry the electricity to the cities, towns, and men who buy it. Feeding into the main line, which is called a "power transmission line," because it carries elec-

tricity from where it is made to where it is used, we would see the wires from many other power-houses along the river. Some of these depend, as did the one we saw, upon a pipe line leading straight from the river itself, others upon great dams in which water is stored and from which it can be led in much larger volume than direct from the bed of the stream. And straight as the crow flies, across moun-



Others depend on dams for the storage of water

tain and canyon, desert and fruitful, irrigated farm, leads the transmission line, so that there may be the least possible loss of power during its long journey.

Leaving the mountains, the use of the power begins. Settlements and towns in the great valley of the San Joaquin take part of it, but most of it is carried still further to cities along the Pacific Coast, where coal and wood are too expensive for use in generating power. The nearest coal to Southern California, in important quantity, is hundreds of miles away, in Washington and New Mexico. There is

very little wood between the coast and the high Sierras. The industrial development and the very existence of great and prosperous cities like Los Angeles, which now has more than two hundred thousand people, depend absolutely upon the supply of electricity produced from the streams in the mountains.



The existence of Los Angeles depends on water power

Before we see the other uses of our river, let us think for a moment what water power means to our country — this silent, latent force which is hidden in every waterfall and every chain of rapids, and some of which even slumbers in the slow-moving current of great rivers. Fifty years ago the development of electricity from water power was entirely unknown. To-day over five million horse power is already developed in the United States. The amount of water power not yet developed and whose development is practicable at reasonable cost is about thirty-seven million horse power. .

W. J. McGee, a man who knows the land we live in as few others do and who sees with a power of vision which reaches far beyond the immediate future, speaks of the possibilities of our undeveloped water powers in these words:

"The thirty-seven million horse power to-day available exceeds our entire mechanical power now in use and would



Power is hidden in every waterfall

operate every mill, drive every spindle, propel every train and boat, and light every city, town, and village in the country."

Who Will Control the Water Powers?

Those of us who live to be old, or even to be middle-aged, will see much of this power harnessed and used. The time will come when our material success will in large part depend upon the attitude of the men who control the

water powers. We will need their product and we may be forced to pay an unfair price. This time is here already for some of us, as in Southern California and in the South-eastern States.

A great struggle is now going on and is not yet fully won, to get laws passed and honestly enforced which will ensure that the water powers still owned by the people in the public domain shall be developed and used in their interest instead of in the interest of a few individuals and a few corporations. The struggle between the American people and those men or groups of men who seek to get unregulated control of the water powers which belong to the people is the kind of struggle in which every good American, man or boy, should take an earnest interest. It is a struggle which has many phases and which involves practical questions of law and its administration, and of justice to the power companies as well as to the people. But in principle it involves the question whether the American people shall continue to hold title to their own property in water powers, and lease them for development under terms which require a fair payment for their use and a reasonable price for the electricity produced, or whether this great resource shall slip from the grasp of the people into the clutching hands of the great interests.

So after all, the question of who shall control the water powers — the people or the interests — is a part of the still greater question, whether the people or the interests shall be master in this country.

Fifty years ago this nation cleansed itself at heavy cost of one form of slavery. To-day a great struggle is going on against slavery of another and a no less evil kind. If the control of forests, water powers, and minerals should pass much further into a few hands — and they have already passed too far that way — then every one of us, no matter

where we live or what we do, will lose a part of that freedom of opportunity which is our birthright.

We need the great power companies with their vast resources and their general willingness to spend these resources quickly and effectively in harnessing the streams for use. Without them we would be individually as helpless to develop water power as were the early settlers. The power companies, in their turn earn, and they should have, a good profit from the sale of the power they develop in return for their risk and their large investment of capital. But when they exact more than that they rob instead of earn.

Remember that this great issue concerns us all. While most of us have been slowly awakening to the tremendous value of the undeveloped power in the streams, the great power interests have been both awake and at work. For ten years or more their engineers have been searching for favorable spots on the banks of streams below falls or rapids, where power-houses might be built. This search has been skilful, diligent, and successful. Power sites have been acquired by the companies often far in advance of any immediate intention to develop them — in some cases simply to withhold them from development and thus stifle competition and maintain or increase the already generally excessive cost of water power.

Already over California, over the mountain region of the South, as well as in the Rocky Mountains, the transmission lines from the power-houses of the great companies, like the tentacles of a giant cuttlefish, are feeling their way into the country around. And like the cuttlefish, these power companies, when their methods are questioned or attacked, hide themselves in waters darkened by the ink of their own arguments. They clamor frantically for the more respectful treatment of invested capital; they point vehemently at the great resource developed by their own initiative and by their



Sometimes water used to develop power never returns to the streams again

great expenditure; they accuse those who oppose them of the wish to check all development; and they take final refuge in the murk of technicalities in defending the fairness of their charges for power. But the fight is on, and the issue

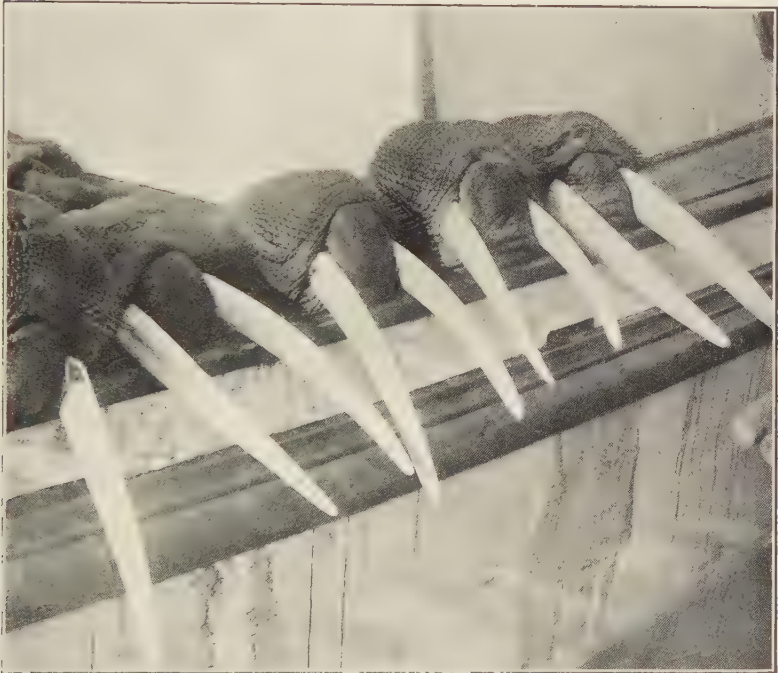


Photo by Dobbs

The walrus are being killed off

is plain. It is probable that an aroused public sentiment will check the further spread of unregulated control of water power before it reaches the stage of absolute monopoly.

Other Great Uses.

We have seen one great use of this river, as of all other fast-flowing rivers in the United States. But if we had followed its course instead of the power lines, we would have

discovered another great form of use. Sometimes straight from the river itself lead the conduits and ditches carrying water for irrigation. Sometimes water taken from the streams to the power-houses never returns to the stream



A female seal and her pup

again, but after its work in the power-house is finished is led on to perform a final service in watering cultivated lands.

All along this river its waters are put to the most natural and important use of all — to keep the life in man and beast. In the mountains the deer and other forest creatures steal down to drink of its cool waters, and the river is a con-

stant source of existence and cleanliness to towns as well as to men.

And so our river travels on until it becomes a part of that resource which belongs to all the world — the sea. If we had time to travel up and down the East coast and then the Pacific coast even to far-off Alaska, we might learn



Where thousands ran before. Can you find the leaping salmon?

something of what a great resource is this — of the oyster beds, and of the seal herds on the lonely islands in Behring Sea, and the great salmon fisheries; and we would find for each of these and many other products of the ocean, how men have wasted them and how they are only just beginning to realize that the waste must stop. We would learn how the walrus are being killed off, and how through senseless slaughter the seal herd has dwindled, not only on the breeding grounds, but in the sea as well; how the silver salmon run now by hundreds where thousands ran before; and how the oyster beds have been so far depleted that both private



Seal on the rookeries. The groups are called "harems," the small seal are the females, and the big seal are males, and known as the "harem masters,"

owners as well as several states now plant oysters to increase their yield, even as farmers sow grass seed on a scanty sod.

Rivers are Roads.

So far we have found that our river is used in three great ways — for power, for irrigation, and for domestic uses.



Tonging for oysters

There is still another great form of use for which many rivers are suitable, — navigation.

We have in the United States about twenty-four thousand miles of water courses which are deep and wide enough to carry boats. Like the settlers, we are coming to realize that many of our rivers are natural roads to travel over; but where the settlers or the Indians used the river to carry only themselves in their birch-bark canoes, we use the navigable rivers as highways for barges loaded with coal, lumber, ore, and grain. They are of vast importance for this

purpose both as carriers and as a means of regulating the cost of railroad traffic. Nothing raises the cost of anything so greatly as the monopoly of it, and some of the railroads have taken unfair advantage of their monopoly of transportation. That is the chief reason why there is such a

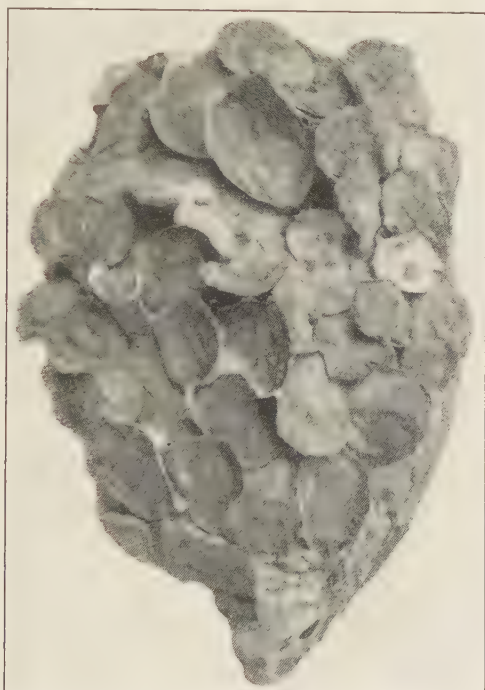


An oyster stunted by mussels which eat its food

great and strong movement afoot to increase the navigable distances in our rivers as well as their capacity to carry big boats. This is done by dredging them and deepening them, by building canals to join them with each other, and by terminals, docks, and freight-handling machinery.

So these are the four great uses of moving water: for power, for domestic use, for irrigation, and for navigation. A great fact which we are just coming to realize, and which

marks the beginning of a new and vastly more productive handling of our rivers, is that all these uses are harmonious, and if rightly administered fit closely and without friction one into the other. Not only are these four uses of any river harmonious, but the same influences, good or bad, affect them all.



A planted oyster shell

If a river is muddy and filthy, not only is the water unfit to drink, but it can seldom be held profitably in irrigation dams. The sediment which settles from muddy water soon fills up a reservoir and the cost of cleaning it out often becomes so high that it does not pay to do it. And muddy water silts up storage reservoirs for water power no less than it silts up irrigation dams. Muddy water in a river

interferes with navigation for the same reason, and our Government has already spent two hundred and fifty millions of dollars in dredging the silt out of the channels at the mouth and along the lower reaches of navigable streams. Forest destruction at the headwaters put the silt in the river beds, and only the restoration of the forest will prevent the continuance of it.

Floods and the low water which follows them do no less harm than silt. A chain is no stronger than its weakest link. The usefulness of a river is measured not by the high water following the rains, but by the steadiness of its flow throughout the year. Very low water means much more than interference with town and city water supplies. It means lack of water in irrigation and other storage reservoirs, which in turn means uncertainty of supply for crops to drink or for the manufacture of water power. Sometimes it means the total failure of the power or irrigation project, with disappointment and great loss and even suffering to many.

When we come to those lower portions of great rivers, deep and wide enough to carry boats loaded with freight from the place where it is produced to those who use it, then we find again how floods impair or even destroy a river's usefulness. The value of a river for navigation is measured by its depth of water which is in turn a measure of the size of the boats it may carry; and if that depth varies greatly during the year, then again there is uncertainty and interruption and loss and even absolute disuse as the result.

A river is a unit from its source to its mouth — a unit physically, a unit industrially, and a unit in its contribution to the public welfare, and it should be handled as such. Up to the present we have treated a river as if it were a house with many carpenters at work on it at once, each following different plans and without a head carpenter to guide them.

The result is seldom economical or useful. What we need above all is a comprehensive plan for developing all the uses of all great rivers to the fullest possible extent. Only when we have it and when we follow it, will we stop playing at cross purposes and wasting money and getting poor results.

CHAPTER IX

WHAT THIS MEANS TO US

A GOOD many people think of this nation and its welfare as having very little influence over their individual lives and fortunes; but whatever affects other people generally affects each of us as well.

The Merchant's Son.

Suppose you were the son of a merchant in a small town, and that your father had built up a successful business by running a general store. He began when the town was only a village, and the business grew quickly like the town. There were many customers and they liked to buy from your father because he sold honest goods at fair prices. They bought more and more each year, because they were prosperous people, or thought they were. Some of them were lumbermen who were making money fast by cutting down the forests, and others were farmers who were also making money by that kind of farming which takes more and more strength from the soil each year, and gives none of it back.

The village becomes what people call a "boom" town. New houses and stores are built, pavements are laid in streets which were mud or dust before, electric lights and street cars make their appearance, a big theatre goes up, and there are many bar-rooms; and one reads in the newspapers, of which there are several with headlines that seem to get larger every day, that a new railroad will soon help carry away the grain and the lumber.

The time comes when your father says: "You take the store now; I have taught you all I can, and I am growing old, and I want to rest awhile."

For a time everything goes well. You are a good business man, and people like to see your father's son behind the counter. You even branch out and put in new lines of goods. But a year comes when, after you have gone over your books, you are surprised to find that you have done no more business than you did the year before. At the end of the next year you find that the business has fallen off a little. Year by year the falling off goes on, and it is harder and harder to collect the bills which people owe you. Those who used to be your best customers not only buy less now, but they let their accounts go unpaid for several months. It worries you greatly, and you have to give up the plans to build a new and better house, and to send the oldest boy away to school.

It begins to look pretty blue. You do not feel that the fault lies with yourself; your methods are the same as when you were successful. You think it all over and you decide to study the whole thing out, and find out what is really the trouble.

What do you find? That the forests, the logs from which filled the rivers full in the early days, are nearly gone; that the rich soil of the farms, which produced wheat and corn by the train load at first, has lost so much of its strength that now twenty bushels an acre is a good crop from the ground which used to yield two or three times as much.

You talk the matter over with other merchants, and they tell you the same story you tell them. Some of them have already closed their shutters and moved away.

The lawyers and the doctors feel it. The hotels are doing very little business. The officers of the new railroad which was talked of saw what would happen long in advance, and

the railroad got no further than the preliminary surveys; while the old railroad has taken off several trains, and raised its freight rates correspondingly, for the less a road hauls the more it must charge.

The "boom" town of twenty years ago is now a very different place. Loafers line the court house square. The goods in the store windows are scanty and second rate. The streets are dirty and nobody seems to care. The railroad station which used to be so lively is sadly changed. In the old days cars filled the sidings, some unloading farm and logging machinery, groceries, seed, and dry goods, and others taking on huge stacks of lumber and grain. To-day there is so little business that the station agent has the easiest job in town.

Everybody knows what is the matter with the town by this time, from the drummer who leaves it and swears never to return, to the workman in the cottages and the business men in their offices. The town is dead.

This is not a fairy story. There are many such towns in the United States. There are even some which have been abandoned altogether.

If the yield of crops from the farm, timber from the forests, or ore from the mines falls off in any locality, the farmers and the lumbermen and the miners are not the only people who suffer. Everybody else suffers too.

The Farmer's Son.

What does waste mean when it is carried on a little farther from where we live? The boy we are talking about this time is a farmer's son. His father settled upon one hundred and sixty acres which the Government gave him forty years ago. He cleared it, and grubbed out the stumps, and put his thought and strength for many years into making it a home. The home was a log cabin at first; but while

the boy was still small, a comfortable frame building took its place.

By the time the boy is big enough to be of some help to his father, the farm is one of the best for miles around; and they are all good in that neighborhood, for the soil is naturally rich and the farmers are thrifty. The boy's father had made the soil still richer by skilful farming. He bought good fertilizers and used them abundantly. He plowed deep and often; and he changed the crops from year to year, so that one crop helped to put back what another drew from the land.

It was a model farm; buildings in good order, sleek thoroughbred stock, and barns full of hay, and corn, and clover. The farmer made not only enough to live on comfortably, but he had a little surplus each year which he put into the bank against a rainy day. As the boy grew up he became more and more trustworthy, until the time came when his father turned over the management of the place to him.

The boy is a good farmer and he loves the land. He keeps it in good tilth, and the farm is even better than when the father ran it, for the son profits by all the new knowledge about farming which the Government gives away for the asking.

But somehow the bank account does not grow. The farm yields more than ever, the freight rates for shipping the crops to market are not much higher; and while it costs more than it did to live, it is not enough to fully explain the difference — the real trouble lies with the taxes. Year after year they grow larger.

Why Taxes are Higher.

The farmer wants to give his children all the advantages possible. He does not want them to grow up ignorant simply because they live in the country; and year by year

he is forced to spend more for taxes, and that means that he has less and less to spend on educating his children. It does not seem fair and the farmer resents it. He complains to the tax assessor, but he gets little satisfaction; at last he finds a man who tells him frankly where the trouble really lies. This is what the man says:

"All you say is true. Your taxes are higher than they ought to be. You and your neighbors are the best farmers in the State. You have n't robbed the soil; you have made it better by farming it properly.

"If all the farmers were like you your taxes would be lower instead of higher. But nearly all the other farmers in our State are robbing the soil by overworking it. The result is that their land is worth less and less each year, and that less and less is produced from it. Taxes are something that farmers and all other people pay to the State on the value of what they own, and on the value of what they produce, so that the State may have money to pay for schools and roads, and for all the expenses of the State government, which enforces law and order and gives everybody protection, and without which we could not get on. Each year the cost of running the State Government gets higher and higher. But the value and the amount of property in the State is not increasing nearly as fast as the number of people. The result is that each man who owns something has to pay more in taxes instead of less.

"This will go on until more is produced; then the individual tax will be smaller. It is hard on you because you are not responsible. About the best thing you can do is to use your influence with everybody you know to make them farm like you do. The State is using all its influence too; but it is a slow business."

So you see in the State, as well as in the town, we suffer for the mistakes of our neighbors.

The Nation and the Government.

You can easily see how we could go on with these examples until we come to the nation itself and to the Government, which represents the nation and does its will. The Government seems a long way off to many of us, except on the Fourth of July, or when something else happens to bring home to us this great power which centers in Washington, and which is beyond the power of the governments of all the states.

Of course the Government has no power except that which the people give it. But one hundred million people have given it freely, and it is a very great power indeed.

Every time you see a regiment of clean-built regulars swinging along in their khaki uniforms, that means the Government; every time you see a great battleship, her steel hull alive with guns and men, that means the Government; every time you see a post-office, from the few square feet of mail boxes in the front of the country store to the huge post-office buildings in the great cities, that means the Government. Every great river you cross is under the care of the Government, which keeps its channel and its harbor clear of silt and free for ships. The great National Forests, which together are as big as California, and five times as big as Virginia or New York, are managed by the Government. The public lands, still belonging to the nation, which cover one third of the United States, are under the care of the Government. For all these things the Government spends several hundred million dollars every year. This money is spent, as the State's money is spent, to make this a safe, happy, and prosperous country to live in—to protect it, to enforce the laws made by Congress, and to take care of the great property which belongs to all the people.

Your share in this nation is like money in a bank. You

are part owner of this country, and you can be called upon to fight for it if necessary. The Government officers are the officers of this great bank. They do not own any more money in the bank than you do. They only take care of what belongs to you. It is your duty not only to see that they are good officers, but to help make it a good bank, for if the bank fails then you may fail with it. The fact that you may have but little in the bank makes no difference; it is yours and you ought to take care of it.

All this is on the selfish side, and it is enough to show that it pays to take a broad interest in what is going on in your own country — the country in which you live. There is another side, called patriotism, which is not selfish.

Patriotism is the spirit which binds all good Americans together, and which is helping greatly to make the world a better place to live in. Patriotism does not mean only that one must fight for his country with weapons in his hands against its enemies from without. It also means that he must fight against the enemies within it.

It is not necessary for the enemy to carry guns. They need not be men. Greed, and extravagance, and waste are very real enemies. The unnecessary injury done by men to this country, short of actual loss of life, has been many times as great since the Civil War as it was during the Civil War.

It does not require warfare, and the smoke of battle, and the clash of the charge, to give men a chance to be patriots. The opportunity and the need is before every one of us to-day to serve our country just as truly as if we served it by fighting for it.

CHAPTER X

HOW WE CAN HELP

IF all this waste of forests and soil and streams and mines and game really means to us individually what the last chapter said it meant, then it is our plain duty to do all we can to stop it.

Complaining about it will not stop it. Saying "I told you so," after the forests are gone and the mines are gutted and the soil is wasted, will not stop it either. Trying to stop it is a good deal like playing a game. Like every other game, we are not likely to win, unless we play it to win.

Knowing the Game.

What is it that makes the winning team? Good heads, strong hearts and bodies, and school spirit are part of it; but a big part is knowing the game through and through.

Have you never seen a big, husky football team go off the field badly beaten, and with more goals against them than they like to count, simply because they do not know the game? Such a team is always being penalized for off-side play, and half the time it does not know where the ball is, and it is continually losing ground where a better trained team would win it, simply because the players have not thoroughly learned the science of football.

It is a good deal the same way with the fight to stop the waste going on all around us. If we just want to see it stopped, but do not know how best to stop it, we will not be of much use on the team.

Some of us might go and tell a lumberman that he was wasting timber by careless logging and that he ought not to let his old cuttings burn up. If the lumberman listened he would probably ask us how we knew this to be true. If we succeeded in interesting him, then he would ask how he could do his work better, and how much it would cost him, and what the results would be. If we cannot tell him, we will make him think that there is merely sentiment and some foolishness about this game we are trying to play, whose rules we do not even know. It would be just the same with the farmer, or the miner, whose methods we criticised.

You cannot teach other people until you know more about the thing you teach than they do. You cannot get a new point of view accepted by practical men unless you present it in a practical way. All this calls for knowing the game just as it does in football. If we do not know the game, then we might as well stay on the side lines.

We cannot learn the game simply by watching it. We have got to study it in all its parts. When the football coach breaks in a substitute, he does not tell him to sit on the bench in a sweater and watch the other fellows play. He puts him to studying the rules, and to tackling a leather dummy, and to learning how to kick and how to catch the ball.

Learning the Game.

There are two big ways to learn about the waste that is going on about you wherever you live. One is to ask people about it, and another is to go and study it. A third good way is to read what other people have written about it.

Of course it is hard for some of us to get out into the open country, but most of us can do it now and then, and for many of us it is easy. The country is a very interesting

place if you look at it not just as a picture with forests and fields and streams and fences and houses in it, but as a record, written as clearly as if it were written with a pen, of what men are doing with the land in which they live. Try to find out if they have helped it or harmed it. Find out what it cost them in either case, and what the profits are.



Learning the game. A school garden is a good place to begin

Do not try to study too many things at one time. Study one farm, or study one forest — even if it is only a wood lot. Study one stream to find out what damage floods did, and whether they come oftener now than they used to come. Just keep your eyes open and your mind open at the same time, and when you find something that is particularly interesting, write it down and store it away. It will not be very long before you will know more about those things than many people who have been seeing them since long before you were born, simply because you look at them from the point of view of all the people, not merely of a few of

them, or one of them. If you keep that up, you will soon learn how to play the game.

Organization Counts.

Football is a good game, and we can learn much from it. Have you ever sat in the grandstand on a crisp fall day,



From photo, copyright, 1910, by Underwood and Underwood

Ramming their way down the field

and had your heart sink deep and deeper as your own team went down to defeat, or nearly yelled your lungs out because it was winning? And have you ever got together with some other fellows after the game was over, and agreed that the reason was that one team or the other lacked what we call "team work"? It is a great sight to see a football eleven, outweighed and perhaps even outplayed, boy for boy, ramming their way down the field again and again, simply because they are so thoroughly organized that they play the game like one man.

The Railroad.

Have you ever sat in a railroad train and thought not about the train itself, but about the great system of which it is only one small part? Of the thirty thousand miles of track, of the thousand other trains, of the many thousand employees, of this huge complicated network alive in all its parts, which brings millions of people what they need, hauls away what they produce, and takes them where they want to go? Have you thought of the difficulties beyond the ordinary everyday difficulties, of keeping this great man-made machine running smoothly and steadily and efficiently? Of the snowstorms and the landslides, the floods and the strikes, the sudden call to move heavy crops or even to move an army?

What makes it possible for the railroad to do its work, and meet every need or emergency effectively and without the waste of one unnecessary minute? It is what men call "organization"; that wonderful combination of team work, systematic methods, common sense, and decisiveness without which real efficiency in anything which men do together, from running a railroad to playing football, is not possible.

The Police Squad.

Have you ever seen a little group of burly, bluecoated policemen boring their way through a threatening, muttering mob — a mob which outnumbered the policemen by a hundred men to one, and which has the power and the will to do ugly work? The mob snarls, and perhaps a few stones are thrown, but with the help of team work that little body of men splits the mob up into fragments and drives it up the side streets; and almost before we know it, there is an empty



Photo by Julian A. Dimock

On the New York Ghetto. These boys are being taught in school about the waste of natural resources, and how it may be prevented. Are you?

square where a few minutes ago was a seething mass of angry men.

When it comes to doing things with our heads instead of with our hands, organization is no less necessary. Of course, if confidence and high purpose are lacking, organization will not win the same fight very long, although it may win it for a little while. But where the purpose is high and the end is practicable, it is good organization which turns the stream of public sentiment into the pipe line of concerted effort, and runs the great engines which turn out not electricity but results.

So it is with the great movement to stop the waste all around us. It must be organized like the football team, the railroad, or the police squad. That work of organization is going steadily forward.

There is the National Conservation Association, of which Gifford Pinchot — the man who first pointed out this waste to the American people — is president; there are many State organizations, some of them exceedingly active and fruitful; and there are other organizations which touch very closely one field or another of this question of waste. It is a good thing to find out about them, which is easy, and to join one or more of them, provided you are prepared to work with them, for such members are the only kind who are of real use.

We Can All Help.

Sooner or later you will have a vote which you can use as another way of stopping waste; but you can be of much help to yourself and others even before that time comes.

These are things which all of us can do, no matter what line of work we expect to take up: We can study this ques-

tion; we can work for its right solution with other workers under organized leadership; we can vote wisely on it later on; and we can see to it that we practise what we preach in anything we do which involves the use of the forests, the soil, the streams, the minerals, or the game.

CHAPTER XI

THIS IS CONSERVATION

WE have traveled a long way together, through many different kinds of country and among many different kinds of people. Everywhere we have seen men using the natural resources, — in the forests, on the farms, along the rivers, far down in the mines, and on the great plains of the West. It was an interesting journey, and it has taught us a little about the land we live in. But one word, which we have all heard quite often in the last few years, has not been used in this book until now — that word is Conservation. It seemed better to leave that word to the last, and for us to go about our country together and see for ourselves what Conservation means, instead of merely talking about it.

So after all, Conservation simply means using the forests, the streams, the soil, the minerals, and the game carefully and wisely, so that we may enjoy them and so that those who come after us may find plenty left to satisfy their needs.

The Ship of State.

Suppose you were a passenger in a great ship, staunch and seaworthy, with coal in her hold for a long journey, and plenty of stores and food, and all that a ship needs if she is going to carry her passengers in safety and comfort to their journey's end; and suppose you were going to travel only a short way in this great ship — only a little part of

the long course she was to follow; would you feel that because your journey was soon to end that you had the right to waste the food aboard, and to throw the coal into the sea? Or even to bore holes in the ship's sides, which might let in only a little water before you left her, but which would let in enough before the other passengers landed to send her to the bottom?

This great nation is like that ship. We enter it when we are born and our journey ends when we die. New passengers are constantly coming on board and others are leaving her. Some enter the ship rich, but are poor when they bid her farewell. Others come aboard with empty hands, but soon fill them. Some pass down the gang plank unnoticed. Others leave aching hearts behind them at their journey's end.

This great ship, which is this nation, like any other ship, must face the perils of the sea. Mutiny, shipwreck, and attack by other ships are the worst of these. A true course, a wise captain, and a faithful crew, which is the ship's Government, will go far to offset these perils. The rest, fair weather and foul, is in God's hands and beyond man's control. But as passengers we can reduce the danger still more by seeing to it that our ship sails full victualed from port to port, and that we use but do not waste the stores she carries; and when we leave her and she turns her bows again to the open sea, that she has a no less ample supply of all the things her passengers need than we enjoyed aboard her. Is not that little enough for us to do? If we do that little, our ship will have nothing to fear from within, and will sail her true course throughout the centuries without fear of any other ship that floats.

What will happen if we are not good passengers? Look around the world. We see ships flying many flags and each bearing a multitude of passengers on their life journey.



From photogravure copyright, 1896, by A. W. Elson and Company

With every white sail set

Some of them sail proud and free, with every white sail set. Others float so deep under their load of humanity that their decks are swept by the following seas. If we went aboard we would find scanty stores and passengers hungry-eyed, and an anxious captain and a sullen crew. And here and there, wallowing in the trough of the sea, we would come across gaunt derelicts, deserted long ago — sodden hulks which drift wherever the wind carries them, a menace to other ships — those wrecked, abandoned nations of the earth.

It pays to be good passengers; it helps the ship, which is our nation, and it helps the passengers themselves. For if we are not good passengers, not only will the ship suffer, but we as well, long before we reach our journey's end.

A Good Fight.

Like most great movements and most great men, Conservation is direct and easily understood. Like all great movements it has its enemies. A few of these are men who do not yet understand what Conservation means. Most of them are men who would rather see the great natural resources used wastefully to enrich a few than used wisely to make life happier for all, now and to come.

The fight for Conservation is a good fight. It is the kind of fight most men have to make within themselves; the fight in which the wish to live wholesomely and wisely and usefully struggles with the wish to live extravagantly and unwholesomely — the fight whose prize is the man's true life and all that goes with it. This nation is making precisely that kind of fight. On the one side are great leaders like Gifford Pinchot, and James R. Garfield, and Theodore Roosevelt, who stand and strive for a no less wholesome life on the part of the nation than on the part

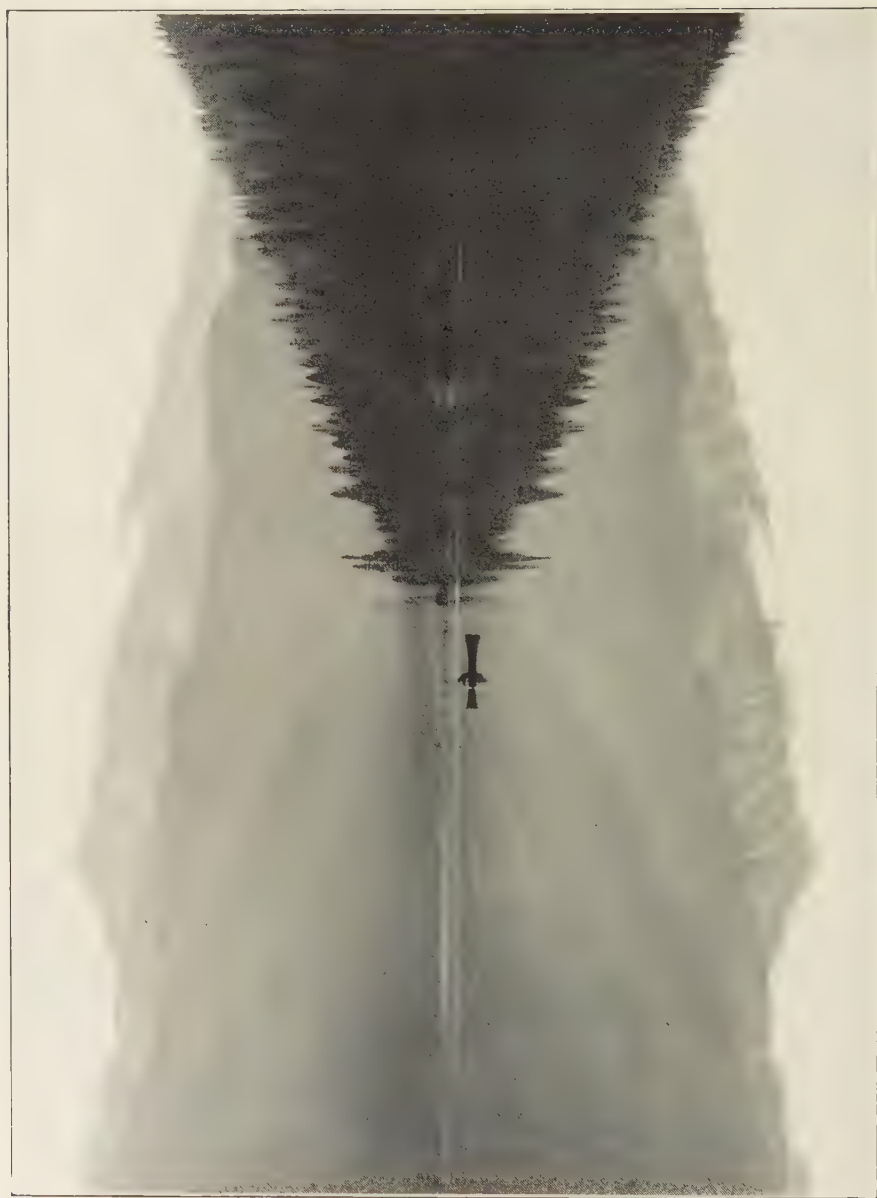
of the men who form the nation. On the other side are men, or groups of men, who strive to make themselves rich



Photo by Julian A. Dimock

Some nations are poor like some children. Countries which have wasted their resources are dependent, and must buy elsewhere. If they lack money, then they must go without

by guzzling the natural resources, regardless of the fortunes of other men and of the fortunes of their country.



Its green forests clothing the mountains

If the men win who oppose Conservation these are some of the things their victory will mean: a fair land, fertile and kindly, will be impoverished and marred; its forests wasted by fire and destructive methods of lumbering; its streams mere sewers for the soil wash from denuded hill-sides; its minerals, which only the ages can restore, reduced below the danger point by reckless use; the fertility of its farms so lowered that they offer only the barren hope of a mere existence to those who till the soil; a nation with a great beginning, checked abruptly in its forward movement and its growth by lack of the substance upon which to feed.

Now, the other side: — What if the great leaders of the people win? A fair land, made still more fair by thrift; a land whose great strength and power lie not merely in the length of its purse, but in the natural resources which give it real independence; its green forests clothing the mountains, and so cherished that they furnish perpetual reservoirs of wood for men's needs; its streams clear and forest fed, unfailing sources of water for men and crops to drink, and for boats to float upon; its minerals wisely used against the time of need; its soil improved by honest tilth, and offering a comfortable livelihood to the jaded dwellers in the towns; a nation great like its beginning, wholesome and strong hearted, traveling onward happily through the unnumbered centuries to its goal. This is Conservation.

CHAPTER XII

AN INVENTORY OF NATURAL RESOURCES

THIS chapter contains a summary of the things we know about the extent, the use, and the waste of America's forests, lands, waters, and minerals. Some of these facts have already been told you in other chapters. They are repeated here, with other facts which you have not yet learned, so that you may have them all together in one short statement.

Forests.

All the forests in the world cover 4 billion acres, or about 24 per cent of the world's total land area. Canada has the largest forests, Russia comes second, and the United States comes third.

Our forests now cover 550 million acres, or about one fourth of the United States. The original forests covered about 850 million acres. About 90 million acres of forest are in the North, 150 million acres in the South, 130 million acres in the Central States, 100 million acres in the Rocky Mountains, and 80 million acres in the Pacific Coast States.

The total amount of all standing timber in the United States is about 2500 billion board feet. Of this 500 billion board feet are hardwoods, and 2000 billion board feet are softwoods.

The United States Government and the States own one fourth of the forests, which contain one fifth of the stand-

ing timber, or about 500 billion board feet. Three fourths of the forests, containing four fifths of all standing timber, or about 2000 billion board feet, are privately owned.

Of the timber in public lands 80 per cent is in the National Forests, 7 per cent in Indian Reservations, 7 per cent in state forests, 3 per cent in the unreserved Public Domain, and 3 per cent in national parks.

Of the timber in private hands there is about 1700 billion board feet in the large holdings of lumber companies and individuals. Wood lots and small tracts contain the remaining 300 billion board feet, as well as about one and a half billion cords of wood.

The yearly growth of wood in our forests does not average more than 12 cubic feet per acre. This gives a total yearly growth of less than 7 billion cubic feet.

Nearly all our native commercial trees grow much faster than those of Europe. We already grow post timber in twenty to thirty years, mine timber in twenty-five to thirty-five years, tie timber in thirty-five to forty years, and saw timber in forty to seventy-five years.

We have 200 million acres of mature forests in which yearly growth is balanced by decay; 250 million acres partly cut over or burned over, but restocking naturally with enough young growth to produce a merchantable crop; and 100 million acres cut over and burned over, upon which young growth is either wholly lacking or too scanty to make merchantable timber.

We take from our forests yearly, including waste in logging and in manufacture, 23 billion cubic feet of wood.

We use each year 100 million cords of firewood, 40 billion board feet of lumber, more than 1 billion poles and fence rails, 118 million hewn ties, 1500 million staves, over 133 million sets of heading, nearly 500 million barrel hoops, 3 million cords of native pulp wood, 165 million

cubic feet of round mine timbers, and 1250 thousand cords of wood for distillation.

Since 1870 forest fires have each year destroyed an average of fifty lives and 50 million dollars worth of timber.



Struggling to win back the land. The dark strips are young trees, which are slowly covering an old burn

The young growth destroyed by fire is worth far more than the merchantable timber burned.

Forestry is practised on less than one per cent of the forests privately owned.

One fourth of the standing timber is left or otherwise lost in logging. The boxing of longleaf pine for turpentine has

destroyed one fifth of the forests worked. The loss in the mill is from one third to two thirds of the timber sawed. The loss in the mill product through seasoning and fitting for use is from one seventh to one fourth. Great damage is done by insects to forests and forest products. An aver-



Forestry in a National Forest. Forestry is practised on less than one per cent of the forests privately owned

age of only 320 feet of lumber is used for each 1,000 feet which stood in the forest.

We take from our forests each year, not counting the loss by fire, three and one half times their yearly growth. We take 40 cubic feet per acre for each 12 cubic feet grown; we take 260 cubic feet per capita, while Germany uses 37 cubic feet and France 25 cubic feet.

We invite by overtaxation the misuse of our forests. We should plant, to protect farms from wind and to make

stripped or treeless lands productive, an area larger than that of Pennsylvania, Ohio, and West Virginia combined. But so far, lands successfully planted to trees make a total area smaller than Rhode Island. And year by year, through careless cutting and fires, we lower the capacity of existing forests to produce their like again, or totally destroy them.

The condition of the world supply of timber makes us already dependent upon what we produce. We send out of our country one and one half times as much timber as we bring in. Except for finishing woods, relatively insignificant in quantity, we must grow our own supply or go without.

By reasonable thrift we can produce a constant timber supply beyond our present need, and with it conserve the usefulness of our streams for irrigation, water supply, navigation, and power.

Under right management our forests will yield over four times as much as now. We can reduce waste in the woods and in the mill at least one third, with present as well as future profit. We can perpetuate the naval-stores industry. Preservative treatment will reduce by one fifth the quantity of timber used in the water or in the ground. We can practically stop forest fires at a total yearly cost of one fifth the value of the standing timber burned each year.

Lands.

The land area of the United States, excluding Alaska and the insular possessions, is about 3 million square miles. Of this area over half is arable, and a little less than half is occupied as farm land. The average size of a farm is 146 acres. There are 6 million farms in the United States. Including the families of farmers, thirty million people are engaged in agriculture.

About one fourth of our land area is forest and one eighth sparse woodland and cut-over land. Two fifths is arid or semi-arid, generally requiring irrigation; one twenty-fifth is swamp and overflow land requiring drainage. Most of the dry, wet, and sparsely wooded lands, with part of the forest area, is adapted to grazing.

About two thirds of the land has passed into private holdings. Of the original 1920 million acres there remains 325 million acres open to entry; nearly all of this is arid or otherwise unsuitable for settlement. There are also about 235 million acres in National Forests, National Parks, and other lands reserved for public use.

We plant nearly 50 million acres of wheat each year, which produce one fifth of the world's wheat crop; 30 million acres of cotton which yield about 12 million bales, or three fifths of the world's cotton crop; and 100 million acres of corn which yield two and a half billion bushels, or four fifths of the world's corn crop.

We have 71 million cattle, 54 million sheep, and 56 million swine, whose total value is about one and three quarter billion dollars. The poultry in the United States are worth about 137 million dollars.

The average yield of our crops per acre shows such slight increase that it does not at all keep pace with the growth in population.

The yield per acre of most of our important crops is far below the yield in older countries. We grow an average of 14 bushels of wheat per acre, while Germany grows 28 bushels and England 32 bushels per acre. We grow about 30 bushels of oats per acre, against 45 bushels in England and 47 bushels in Germany.

Both the yield per acre and the productive farm area can be greatly increased. Right methods of farm management will at least double our crops; and we have 75 million acres

of swamp land most of which it is practicable to reclaim by drainage, and many million acres of desert which can be made productive by irrigation. The injury to farm crops due to insects, diseases, and animals costs nearly 800 million dollars a year. Most of this loss is preventable. The



Many million acres of desert can be made productive by irrigation

farms of the United States can be made, under skilled and thrifty methods, to grow food enough to support a population three times the size of our present population.

Waters.

The source of all fresh water is rainfall, including snow. The average yearly rainfall in the United States is about 30 inches. Its volume is equal to ten Mississippi rivers.

More than three sixths of the yearly rainfall is evapo-

rated; two sixths flows into the sea; the remaining one sixth is either consumed or absorbed.

At present only about 13 million acres are irrigated. When all lands capable of being irrigated are under irrigation, they will support a population of at least 20 million persons.

Our developed water powers are about 5 million horse power. The undeveloped water powers in American streams, whose development is practicable now, contain 37 million horse power.

We have 295 rivers which are navigated, and they have a total length of 26,400 miles of navigable water. At present their use is greatly impaired by lack of improvements, and by irregularity of flow due directly to the destruction of the forests upon their headwaters. It costs from one fifth to one tenth as much to transport freight by water as it does by rail.

The yearly damage by floods is now nearly 250 million dollars. Ten years ago it was about one fifth as much. The chief causes for this greatly increased flood damage are forest fires and destructive logging.

Nearly 800 million tons of earth are carried each year by the rivers into their harbors and into the sea. The damage to our farms through soil wash is fully 500 million dollars a year. The chief causes of erosion and of silt in the streams are forest destruction and poor farming methods. Both are preventable, and both now entail huge and unnecessary loss.

Minerals.

The United States has larger mineral resources than any other nation. The value of the minerals mined each year is about 2 billion dollars, and 65 per cent of the freight traffic of the country is in carrying the products of the mines.



Photo by Bailey Willis

More than 2 million men work in mines, and about 2 million more are employed in handling, transporting, and manufacturing mineral products. Our anthracite coal deposits are the largest in the world.

The known supplies of high-grade iron ores in the United States are about four and three quarter billion tons. There are also estimated to be about 75 billion tons of low-grade iron ore which may hereafter be available for use.

Our waste of life and minerals in mining is appalling. During the last ten years more than 20 thousand men were killed and not less than 50 thousand men were injured in coal mines alone.

The yearly consumption of coal in this country has about doubled every ten years. Our individual yearly consumption of coal is now about $5\frac{1}{2}$ tons. For every ton of coal mined, not less than half a ton is wasted. At the present increasing rate of consumption, and if the waste continues, our easily accessible and available coal supplies would be exhausted in a little over one hundred years, and our entire supply would be used up in about one hundred and fifty years.

At the present rate of consumption our high-grade iron ores would be exhausted in about 40 years, when we would be dependent upon low-grade ores. The supplies of petroleum and natural gas so far discovered are not expected to last more than 100 years. The high-grade phosphate rock probably will be exhausted in much less than 100 years.

INDEX

A

- Agriculture, Department of, 104-107.
- America, three hundred years ago, 2-18; to-day, 19-34.
- American Government and the Indians, 13, 14.
- Animals, early American, 3, 5; and the Forest Service, 74, 75; predatory, 177-182. *See* Game.
- Antelope, the, 129, 168.
- Aztecs, story of, 126, 127.

B

- Black Forest, the, 35-40.
- Bonanza farming, 111, 112.
- Boys the best farmers, 105, 106.
- Bronco busting, 125, 126.
- Buffalo, 128, 129, 175.
- Bureau of Mines, the, 152-155.
- Burros, 122.

C

- Cabinet National Forest, the, 92.
- Cape Henry, lighthouse at, 2.
- Cascade Mountains, the, 47-54, 66.
- Cattle on the range, 129-131.
- Cattlemen and sheepmen, 129-131.
- Clearwater National Forest, the, 91.
- Climate of America, 7.
- Coal, what would happen if there were none, 140-143; mine, in a, 143-148; waste of, 148-151, 237; how long it will last, 155, 237.
- Coeur d' Alene, National Forest, the, 90.
- Congress, the American, opponents of the Forest Service in, 93.
- Conservation, the movement, vi, vii; what it means, 221; the fight for, 224-227.
- Corn, 103, 104, 108.

- Corrals, 125, 126.
- Cortez, story of, 126, 127.
- Cotton, 100-102.
- Cowboys, 72-75, 123-127.
- Crops, 100-115, 233.
- Cypress, the, 43.

D

- Dams, 134-137, 191.
- Depot, the, of the Pennsylvania R. R. in New York, 19, 21.
- Desert land of America, 116-138.
- Devil's Club, 49.
- Douglas fir, the, 47-54.

E

- Electricity, produced by water power, 189-193.
- Elk, the, 168, 169.
- England, the food supply of, 113, 114.
- Europe, the handling of forests in, 35-43. *See* Germany.
- Evans, Joseph, 154.

F

- Farmers, and farming, 99-115; boys the best, 105, 106; sons of, how affected by waste, 208, 209.
- Farms, good and neglected, 23, 26, 27; and farming land, 99, 100; more and less productive, 100-115; three classes of, 112; must be made to yield more, 113-115.
- Fires, forest, devastations of, 23, 25, 47, 54, 60, 62; the ranger on the look-out for, 69-72; how they start, 80-83; fighting, 87-90; dangers of, 90-93.
- Fires, in mines, 151.
- Fish, 6, 199.
- Floods, 29.

Food supply, 113-115.
 Football, organization in, 216.
 Forest, nurseries, 39, 40; rangers, 40; fires. *See* Fires.
 Forest of Frankfort, the, 156-162.
 Forest Service, the, vi; what it is doing for the nation, 73-75, 92, 93; opponents of, 93; services of Gifford Pinchot and Henry S. Graves in, 94; is teaching the people how to care for their forests, 96-98; its two great tasks, 98.
 Forester, the, 94.
 Forestry, the reason why it is not practised in America, 95, 96; practised on less than one per cent of the forests privately owned, 230.
 Forests, early American, 3, 5; of today, 23, 25, 26; results on rivers of the destruction of, 27-31; in Germany, 35-42, 156-162; sprout, in the Rhine valley, 41, 42; spruce, in Saxony, 42; in the Southern pine belt, 43-47; the Douglas fir, 47-54; the North Woods, 54-60; are being used up, 63, 64; private, 94-96; what they do, 96; work of Reclamation Service depends on, 137; an inventory of, 228-232. *See* Waste.
 Forests, National. *See* National Forests.
 Frankfort, the forest of, 156-162.
 Furs, 175.

G

Game, American, 3, 5, 128, 129, 164-177, 179-183; in Germany, 159-163.
 Garfield, James R., 131, 224.
 Germans in New York, 163-166.
 Germany, forests and game in, 35-42, 156-163, her villages and farms in, 113-115; hunting in, 162, 163.
 Government, the American, and the Indians, 13, 14; and the Nation, 211, 212.
 Graves, Henry S., 94.

H

Heard, Dwight B., 131.
 Holmes, Dr. Joseph A., chief of U. S. Bureau of Mines, 152.
 Hunting, in Germany, 162, 163; in America, 163-177.

I

Indian Office, the, 13.
 Indian problem, the, 13, 14.
 Indian Reservations, 9, 13.
 Indians, at the time of Columbus, were friendly, 9; later, hostile, 9; the number of, 9; Reservations cf, 9; a burial scaffold of, 12; treatment of, by the American Government, 12-14; the problem of, 13; employed to build the Roosevelt dam, 14.
 Iron, how long it will last, 155, 237.
 Irrigation, works, 132-138; use of rivers for, 197, 198.

J

Journey, with the settlers, 16-18; of today, 19-33; down a river, 185-191.

K

Kaufman, Ranger, 92.
 Knapp, Dr. S. A., 104-106.

L

Lands, an inventory of, 232-234.
 Life, waste of, in mining, 148-151.
 Lighthouse at Cape Henry, 2.
 Log-jam, a, 31.
 Log-loader, the, 45, 46.
 Logging, in the Southern pine belt, 45-47; in the Cascade Mountains, 47-54; in the North Woods, 54-60; in the National Forests, 77-80.
 Lumber, 25.

M

Maine, logging in, 55-60.
 McGee, W. J., 193.
 McKenzie, Murdo, 131.
 Means, we must live within, 32-34, 114, 155.
 Merchant's son, the, how he is affected by waste, 206-208.
 Mill, power, abandoned for lack of water, 30.
 Mine, coal, in a, 143-148.
 Mineral soil, 28.
 Minerals, 6, 140, 235-237.
 Mines, disasters in, 149-151; fires in, 151.
 Moore, Jerry, 105.

N

- Nation, the, and the Government, 211, 212.
- National Conservation Association, the, 219.
- National Forest, a rancher in, 66; the ranger in, 67-72, 75-78; on the lookout for fires in, 69-72, 80-86; grazing in, 72-75; fighting the fires in, 87-90; the Coeur d'Alene, 90; the Clearwater, 91; the Cabinet, 92; what is done by the Forest Service for, 92, 93; opponents of, 93.
- Natural Resources, an inventory of, 228-237.
- Navigation, use of rivers for, 201-204.
- Newell, Frederick Haynes, Director of the Reclamation Service, 136.
- North Woods, logging in the, 54-60.
- Nurseries, forest, 39, 40.

O

- Organization, value of, 216-220.
- Oyster beds, 199, 201.

P

- Paper, spruce growing for, in Saxony, 42; tree cutting for, in Maine, 57.
- Patriotism, 212.
- Pinchot, Gifford, 94, 131, 219, 224; Foreword by, v, vi.
- Pine belt, Southern, the, 43-47.
- Pipe line, a, 188.
- Police Squad, organization in, 217.
- Power. *See* Water power.
- Power mill, abandoned for lack of water, 30.
- Prairie dogs, 178, 179.
- Predatory animals, their cost to us, 177-182.
- Private forests, 94-96.
- Public Domain, the, 115-127; the use and abuse of, by the stockmen, 127-129; the range is being wasted, 129-132; work of Reclamation Service in, 132-137; the three great problems of, 138.
- Pulaski, Ranger, 90, 91.
- Pullman car, the, 21.

R

- Railroad, the, organization in, 217.
- Rain, value of, 7; how it falls on the forest and on the bare soil, 28.
- Range, the open, 117-129; is being wasted, 129-132; wars, 130, 131; plan for regulation of, 131, 132.
- Ranger Pulaski, 90, 91.
- Rangers, forest, 40; in the National Forests, their duties, 67-72; on the lookout for fires, 69-72, 80-86; fighting the fires, 87-90; in the Frankfort Forest, 59-161.
- Reclamation Service, work of the, 132-138.
- Reservations, for Indians, 9, 13.
- Rhine valley, the, 40-42.
- Rivers, in the time of the settlers, 6; results of forest destruction on, 27-31; a journey down a river, 185-191; use of, for water power, 188-193; who will control the water power of? 193-197; use of, for irrigation, 197-198; domestic uses of, 198; use of, for navigation, 201-204; a comprehensive plan for, necessary, 203-205.
- Roads, 108.
- Roosevelt, Theodore, 224.
- Roosevelt irrigation dam, the, 14.
- Royal hunt, a, 162, 163.

S

- Salmon, 199.
- Saw mills, 25.
- Saxony, forests in, 42.
- Settlers, America in the days of, 3-7; what we owe to them, 7, 8; a picture of, 14, 16; a journey with, 16-18.
- Sheep, 121, 122, 129-131.
- Sheep herders, 122.
- Sheepmen and cattlemen, 129-131.
- Ship of State, the, 221-224.
- Shipp, Thomas R., vii.
- Slavery, to the great interests, 194, 195.
- Southern pine belt, the, 43-47.
- Springs, origin of, 28.
- Sprout forests, 41, 42.
- Spruce forests in Saxony, 42.
- Stock industry, 127-132.
- Stumpage, 96.
- Swamps, Southern, 43.

T

- Taxes, why they are higher, 209, 210.
 Thenon, Deputy Supervisor, 91, 92.
 Thrift, lack of, 102, 107.
 Timber, is being used up, 63, 64; sale, the, 77-80.
 Tunnel, the, under the North River, 21.
 Turpentine orchards, 44, 54.

W

- Walrus, 199.
 Waste, of American life, 32-34; in American logging, 54, 58, 60, 62, 63, 64; reasons for, 95, 96; of the range, 128-132; of life and of coal, in mining, 148-151; of animals, 167-177; of fish, 199; how it affects all people, 206-212; how we may help stop it, 213, 214, 219, 220; how to learn about it, 214, 215; movement to stop, requires organization, 219, 220.
 Water power, 6; how obtained and value of, 188-193; who will control? 193-197.
 Waters, an inventory of, 234, 235.
 Wild life, 156-183. *See* Animals, Game.
 Woodcutters and woodcutting, in the Black Forest, 35-38; in the Southern pine belt, 45-47; in the Cascade Mountains, 51-53; in the North Woods, 54-60; in the National Forests, 77-80.

